



Civil Engineering

WORKING IN THE ENGINEERING FLIGHT

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This pamphlet describes the Air Force Engineer's role in activities required to plan, develop, and manage contract programs to construct, improve, and maintain base facilities and resources in support of the Civil Engineer's mission.

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Chapter 1 Introduction and History of the Engineering Flight

1.1 The History of Engineering Flight

Over the years, the Engineering Flight has run the gauntlet of change and reorganization due to downsizing with the current configuration fallout from the Office of Secretary of Defense (OSD) Defense Management Review Decision (DMRD) 967 study. The OSD 1990 management study proposed six major initiatives:

- (1) the creation of public work centers,
- (2) zonal maintenance,
- (3) multiskilling of military workforce,
- (4) creating Maintenance Engineering Element,
- (5) military reduction of 21,800 positions, and
- (6) a savings of \$2.4 billion within a six-year period.

As a result of this study, the current configuration of the Civil Engineering Squadron evolved. After an evaluation of DMRD 967, the Air Force concluded what was proposed by the study would severely degrade wartime capability and responsiveness to customer needs. The initiative offered by the Air Force as a counter-proposal maintained the intent of OSD, without compromising readiness and responsiveness. The Air Force initiatives included:

- (1) reducing the functional layers,
- (2) reducing the number of career fields from 17 to 10,
- (3) reorganizing based on tasks instead of skills,
- (4) increasing productivity of individuals and teams,
- (5) reducing military strength from 28,950 to 22,765,
- (6) saving \$915 million within a six-year period,
- (7) increasing war fighting capability, and
- (8) increasing customer satisfaction.

It was the superb efforts of the various Civil Engineering (CE) study groups that resulted in the Air Force's redirection effort and their acceptance by OSD. DMRD 967 was the catalyst that caused the CE community to re-examine their organization philosophies and concepts and to reposition the Base Civil Engineer (BCE) for the demands of the 21st century.

The Civil Engineering Squadron reorganization under the objective squadron concept, the realignment of manpower, skills, training, and responsibilities, was developed to

achieve the efficiencies and customer satisfaction standards demanded from a service organization.

1.2 The Objective Squadron

The approval and implementation of the objective squadron structure developed a basic and standard capability throughout the Air Force. A major concern at all command levels is the ability to meet mission demands in a timely and efficient manner in an era of diminishing resources. Sophisticated weaponry and new technologies continue to drive the need for innovative management techniques under austere funding conditions. Imagination, discipline, and foresight, forged with a can-do attitude, create the environment necessary to achieve desired goals.

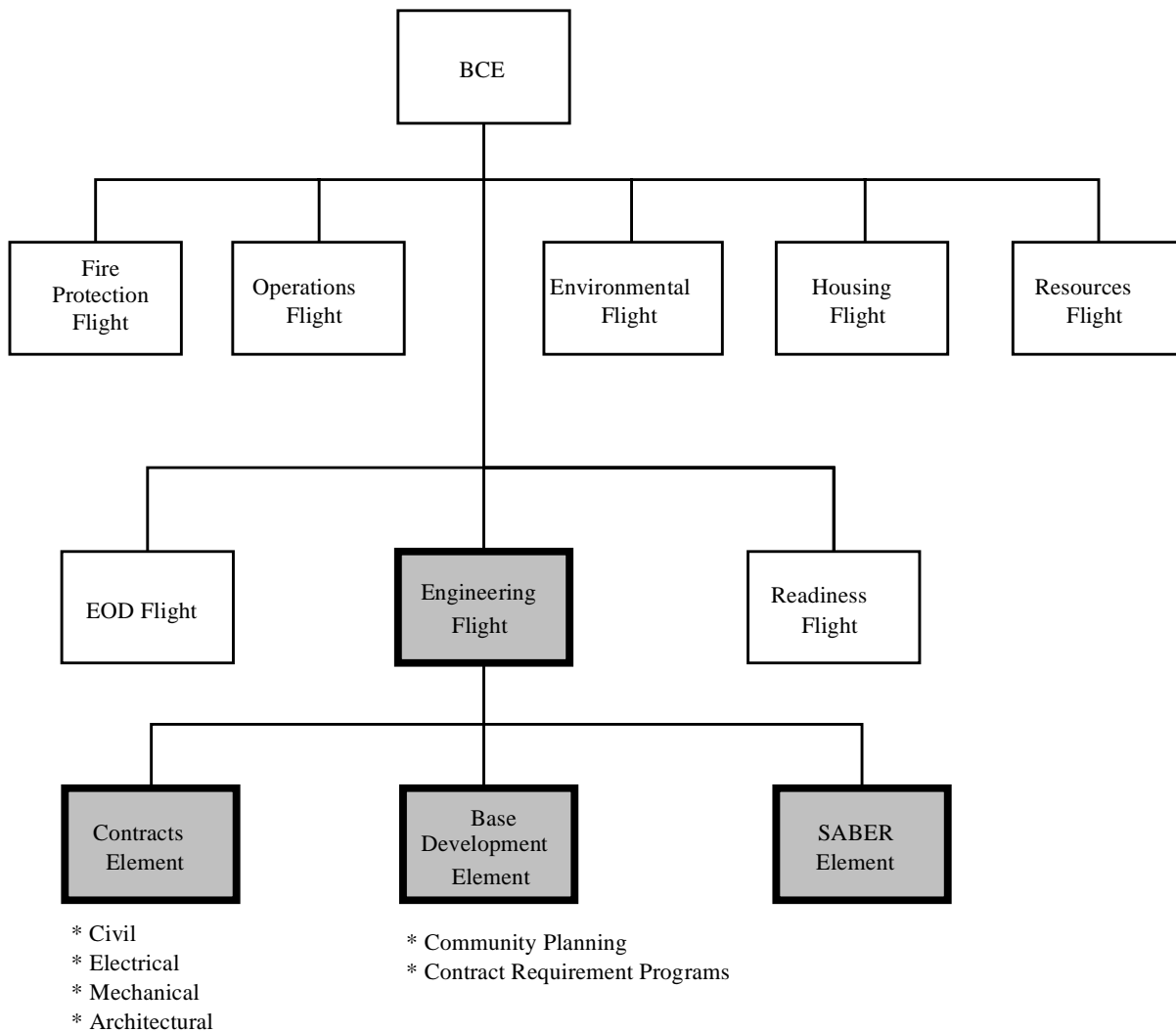
The objective squadron was formed to improve job accomplishment and centralize the work or the mission. The objective was to reduce unnecessary or redundant supervisory positions, multicraft and multiskill the workforce, and implement better, business-like practices to the process associated with work accomplishment. The reorganization of CE into its current eight-flight configuration marked a major improvement in the CE structure. Previously, the focus of CE on functions resulted in some inefficiencies. To become more efficient and customer focused, the new structure consolidates functions and crafts by products, such as readiness, environmental, and resources. The centralized shop structure in the Operations Flight was changed to emphasize product-oriented, multiskilled teams. The Maintenance Engineering Element in the Operations Flight was established to link the technical engineering expertise with the practical craftsmen work accomplishment and to place greater emphasis and management on the often neglected infrastructure program. Engineering embarked on a cradle-to-grave process for design and construction management for all projects by contract.

1.3 Engineering Flight

The objective squadron organization chart shows the Engineering Flight within the squadron and the three elements composing the Flight (shown in Figure 1, The Objective Squadron Organization). In the old organization, the Engineering and Environmental Branch was organized on processes (i.e., engineering technical design, contract management, and real estate). The new organization is based on the end product and stresses cradle-to-grave planning, programming, design, and contractor management of major construction projects. This approach is more customer-

focused and streamlines the work process, thereby producing manpower economies and efficiencies. The three elements of Contracts, Base Development, and SABER represent the final structure of the Engineering Flight. Contracts represents the consolidation of the engineering, technical design, and contract management work centers, whereas, base development is that portion of the engineering and environmental planning work center which remained after the environmental function was elevated to a flight.

Figure 1.1. The Objective Squadron Organization.



1.4 The Manpower Standard

The Air Force Manpower Standard (AFMS) 44EC, details the manning for the Engineering Flight. Using the formula detailed in the front section and determining the applicable manpower ranges, the manpower managers in the Resources Flight can consult the Standard Manpower Tables in the back to identify the manning authorized. Figure 2, Personnel Authorizations in a Core Objective Squadron by Organization and Totals, shows the configuration of the eight flights. A breakdown of officer, enlisted, and civilian positions are shown in the scoreboard boxes for each flight.

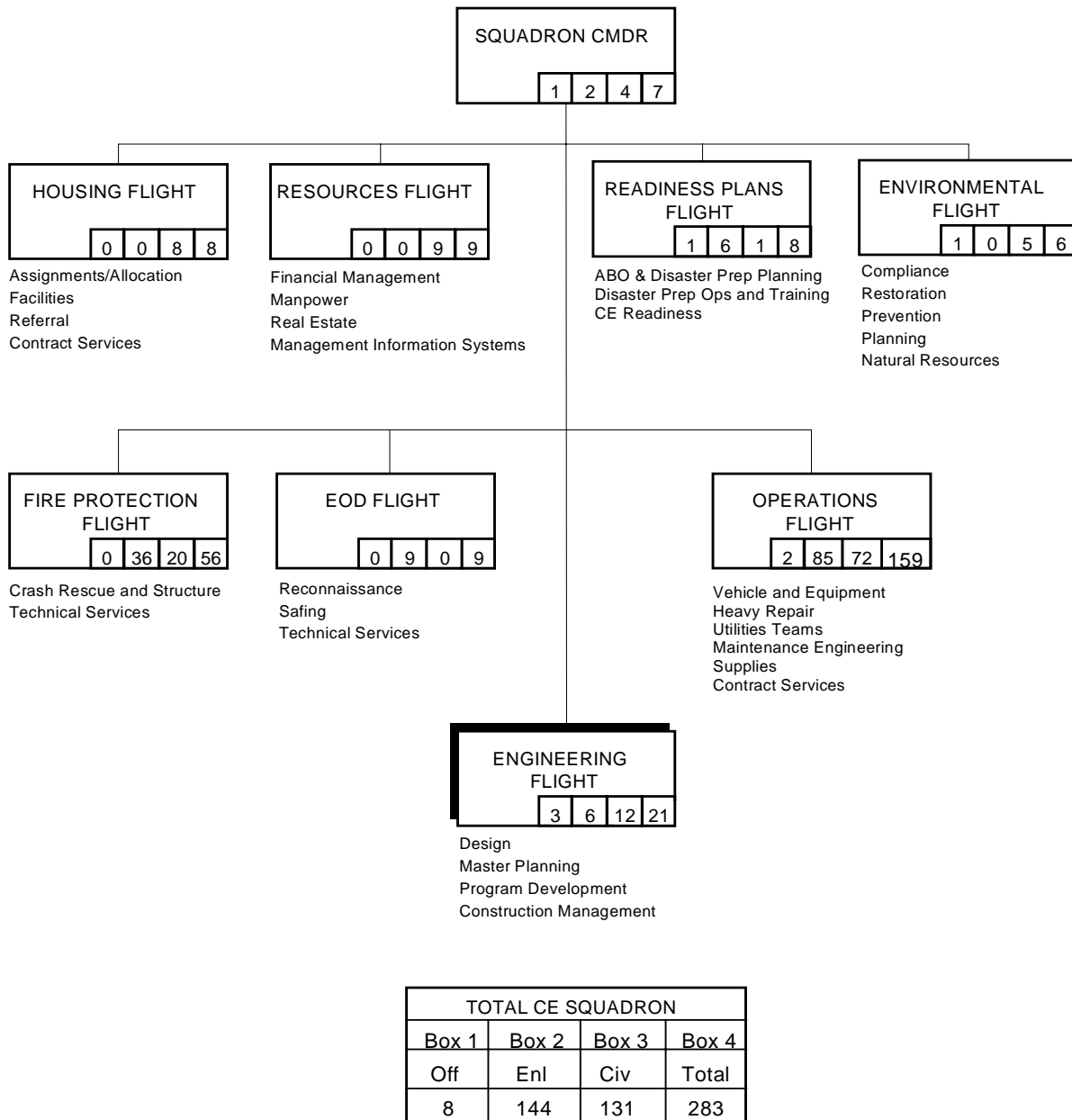
1.5 Mission Statement

The Engineering Flight provides for cradle-to-grave technical, design, and construction surveillance of operations and maintenance projects by contract and simplified acquisition of base engineering requirements (SABER) projects. Also included are the management and preparation of technical data, studies, and evaluation of these projects' base community and comprehensive planning and programming.

The Engineering Flight provides the planning, programming, design, and construction in support of facilities, utilities, airfields, and roadways at each installation within the Air Force. The supported systems provide the basic platform from which all Air Force missions are developed, planned, provisioned, and launched. Facilities range from basic administrative space to state-of-the-art aircraft, industrial, laboratory, and test structures.

As an integral part of accomplishing the mission, the Engineering Flight must interface with all levels of every activity assigned to the installation. They must be intimately familiar with the goals and missions of the organizations, as well as have the technical ability to provide high quality engineering solutions to complex system and mission problems.

Figure 1.2. Personnel Authorization in Core Objective Squadron by Organization & Totals.



1.6 Work Approval Process

At each installation, Civil Engineering work requests are usually reviewed through some type of work approval process. As an overview, Figures 1.3 and 1.4 - Work Approval Process, attempts to outline how a typical installation may institute this process.

Figure 1.3. Work Approval Process, Part 1.

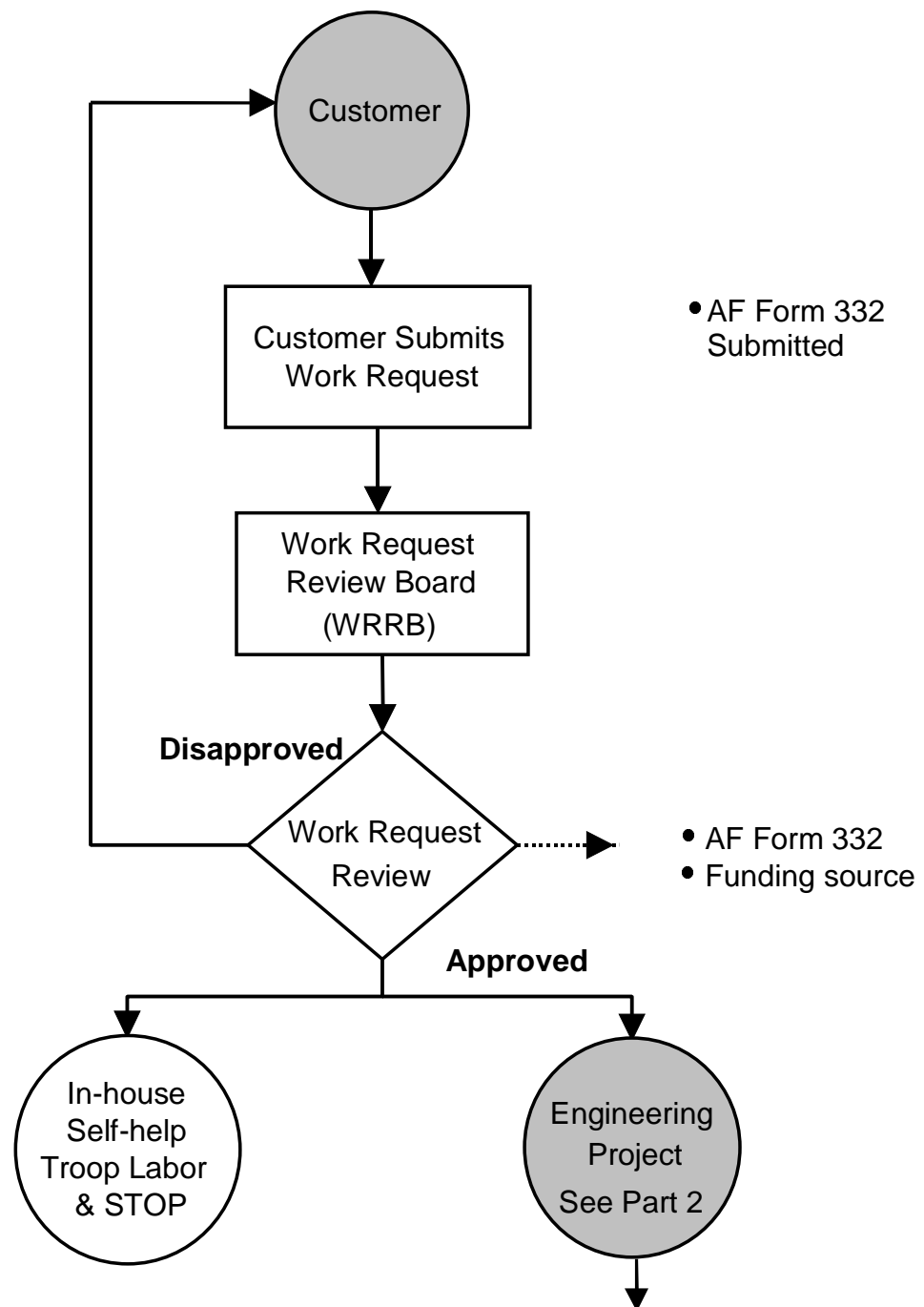
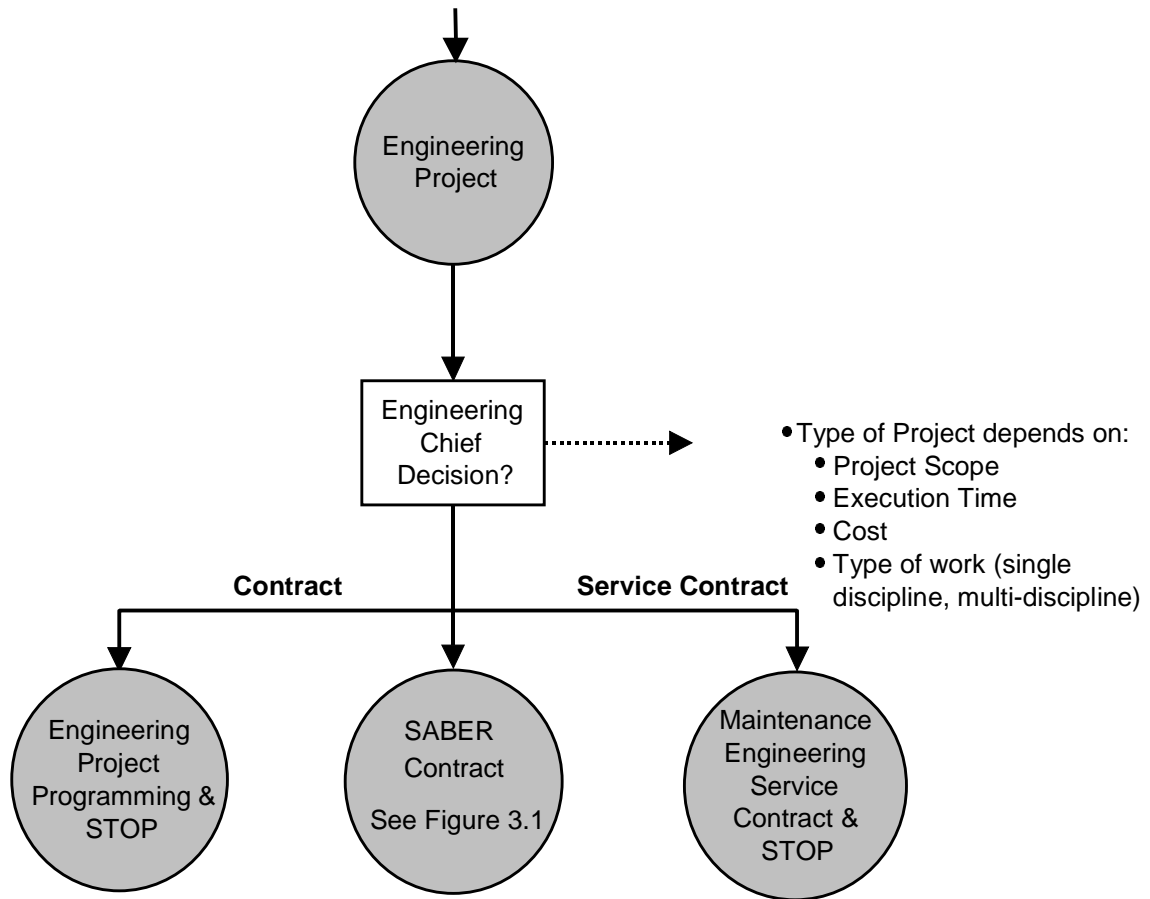


Figure 1.4. Work Approval Process, Part 2.



Chapter 2 Responsibilities and Objectives of Contracts Element

2.1 Mission Statement

The overall mission of the Engineering Flight is to plan, develop, and manage contract programs to construct, improve, and maintain base facilities and resources in support of the Air Force mission. The Contracts Element is tasked with the overall management of construction contracts under the cradle-to-grave concept. Under this procedure, projects are initiated, designed, and constructed by the assigned team until completed and accepted by the government.

2.2 Design Team Responsibilities

In the team concept, the project designer, engineering assistant, and construction inspector/QAE, who are initially assigned a project, will be responsible through construction completion. The Chief of Contracts will temporarily adjust project assignments to cover these situations. The minimum allotted time for project design should be 60 percent for junior engineers and 50 percent (allowing ten percent for leader duties) for team leaders. The remaining non-design percentage should be dedicated to construction management support (i.e - meetings, submittals, site visitations), consultation, suggestion evaluations, training, and other additional taskings.

2.2.1 *Project Designer/Project Manager*

The project designer/project manager is responsible for a project from the inception of the design to construction completion. The project designer is responsible for ensuring the project design progresses according to the established design completion schedule. The project designer will continually inform the Chief of Contracts of any situation which will delay the completion dates. The project designer will ensure the following tasks are accomplished:

- (1) Visit and discuss the project scope with the customer before starting design work; relevant site conditions are noted.
- (2) Accomplish the design reviews in accordance with internal operating procedures and as further described in more detail later in this pamphlet. It is the project designer's responsibility to initiate and monitor the base review process and ensure timely completion.
- (3) Upon project funding, ensure the project is appropriately processed, attend the pre-construction con-

ference, and along with the construction inspector/QAE, make at least one visit to the site each week.

- (4) Ensure the construction inspector/QAE receives assistance in development of any modifications that may occur during the construction. Chief of Contracts is provided with up-to-date construction status for maintenance of contracts in the WIMS/PCMS or ACES/PM database.

2.2.2 *Engineering Assistant (EA)*

Each design team includes an engineering assistant(s). The assistant's typical duties will include the following:

- (1) Obtain for the project designer all pertaining as-built drawings from the record files.
- (2) Conduct proper preliminary and final surveys of the project site in accordance with accepted engineering practices.
- (3) Maintain and safeguard old sketches, notes, and red-lined review sheets developed during the design phase.
- (4) Follow applicable drafting standards in accordance with current policy and procedures.
- (5) Ensure drawings are correctly filed and numbered.
- (6) Coordinate with all reviewing agencies for signature approval.
- (7) Upon project funding, reproduce and forward the appropriate number of copies of 100% drawings and specifications to the base contracting office.

2.2.3 *Construction Inspector/Quality Assurance Evaluator (QAE)*

The main responsibility of the team's construction inspector or sometimes referred to as the Quality Assurance Evaluator (QAE) is to ensure the government receives quality and completed work, as outlined in government-produced contract documents (i.e., specifications and project drawings). This is accomplished through management procedures and policies that extend from design throughout the life of the facility. Policies must be established to facilitate quality construction and to monitor the effectiveness of management techniques. The senior construction inspector or supervisor of the section shall:

- (1) Standardize and implement inspection policies, and ensure new personnel are properly trained.
- (2) Maintain construction operating instruction.
- (3) Ensure overall quality control of the PCMS/PM database.

Duties and responsibilities of construction inspector/QAE will be further expanded in Section 2.3, Construction Management of this AFPAM.

2.3 Design Procedures Overview

The following provides a general overview of the Contracts Element design processes and procedures. The project designer and associated team member must become thoroughly familiar with all internal flight operating instructions to completely understand the project execution process.

2.3.1 Introduction

There are two primary methods to design projects for contract action. Designs can be accomplished with either an in-house design team or by a commercial Architect-Engineer (A-E) design firm.

The term "in-house design" refers to a design done by the Civil Engineer squadron personnel. The design team provides design services for a client on the base (using agency).

A-E design refers to work contracted to a private A-E firm, usually via one of the Flight's open-end contracts. With A-E work, the government's project engineer ensures that the same design effort is carried out, only the work is performed by an A-E firm. The project designer's main responsibilities are writing the statement of work (SOW), preparing the design fee estimate, assisting contracting in negotiating the design fee, reviewing and coordinating design submittals, and processing the 100 percent design documents for contract action.

The project designer ensures that the A-E prepares contract documents per the general instruction for delivery orders for indefinite delivery A-E services contract. The project designer must then evaluate the A-E performance using an DD Form 2631, Performance Evaluation (Architect-Engineer). If design flaws are discovered during construction or after completion, the project designer is responsible for working with contracting to ensure corrections are initiated through the A-E and/or that A-E liability damages are pursued.

2.3.2 Project Assignment

Projects are assigned by the Chief of the Contracts Element. All projects must have an approval document, either a DD Form 1391 or an AF Form 332, Base Civil Engineer Work Request, prior to design initiation. In an emergency

situation, the project designer may begin design on a project prior to its formal approval on paper. In this case, the project designer is required to aid in the generation of the approval documents.

NOTE

If a project is classified as a Military Construction (MILCON) project, see Section 2.8 of this AFPAM for details.

2.3.3 *Project Familiarization*

Prior to design start, an initial investigation should be performed for a better understanding of the project requirements. This step consists of two parts, research and organization of information.

Research for project design can be found in several sources.

- (1) the information in the DD Form 1391,
- (2) the AF Form 332,
- (3) backup information project files,
- (4) the Contract Programmer in Base Development,
- (5) similar past projects,
- (6) as-built drawings on the subject facilities, and
- (7) initial product information (available in the Sweet's Catalogue volumes or CD ROM database).

In all cases, the research should include a visit to the site for initial investigation of conditions prior to the pre-design conference.

When renovating spaces with many users (i.e., offices or administrative areas), the project should be discussed with all the potential users, not just the Commander or any other single individual. This can reveal potential problems that might not be identified until the construction stage or later.

Familiarity with all applicable regulations, Air Force Instructions, Engineering Technical Letters, manuals, and codes which may govern design decisions on the project is important.

Another source of valuable information are the work center personnel in the Operations Flight. These people have first hand experience in the maintenance and repair of the base facilities. Their inputs can save valuable time and expense.

Organization of information is a key to both an efficient design process and inclusion of all design requirements

identified. All requirements identified should be written down and ultimately filed in the project files for potential future reference. Files shall be maintained in accordance with CEC administrative/operating procedures. Whenever a folder is removed from central files, the properly completed pink slip must be inserted so the location of the file is known. When the project familiarization stage is complete, the project is considered to be at the ten percent stage.

2.3.4 *Selecting Architect-Engineering Firms*

If it is determined that an A-E firm is best suited to complete the design, the following guidance identifies the types of architect-engineer (A-E) services available to the BCE and the contracting procedures involved with procuring these services. FAR Part 36.601-4 (a), defines the following services to be ‘architect-engineering services’:

(1) Professional services of an architectural or engineering nature, as defined by applicable State law, which the State law requires to be performed or approved by a registered architect or engineer.

(2) Professional services of an architectural or engineering nature associated with design or construction of real property.

(3) Other professional services of an architectural or engineering nature or services incidental thereto (including studies, investigations, surveying and mapping, tests, evaluations, consultations, comprehensive planning, program management, conceptual designs, plans and specifications, value engineering, construction phase services, soils engineering, drawing reviews, preparation of operating and maintenance manuals and other related services) that logically or justifiably require performance by registered architects or engineers or their employees.

(4) Professional surveying and mapping services of an architectural or engineering nature. See FAR Part 36.601-4(a) for further clarification of this item.

The previous language describing A-E services (*Title I, Title II, Base Comprehensive Plans, and Other A-E Services*) should no longer be used. Instead of Title I and Title II, describe the specific type of A-E service required, such as planning, design, engineering, surveying or mapping, or construction phase services consistent with language in the

Brooks A-E Act. Construction phase services are broadly defined as services provided by A-E firms, in-house personnel, construction management firms, or other sources during the construction of a project. Funding for such services depends upon whether these services are provided for the purpose of completing the design effort or assuring contractor compliance with requirements. The following section addresses types of A-E services and funding criteria in greater detail.

2.3.4.1 Statutory Fee Limitation

“Title 10, United States Code 9540 (a) and (b) limits that portion of the A-E’s fee for direct design services to six percent of the estimated cost of the construction project for producing and delivering designs, plan, drawings, and specifications needed for a construction project. FAR 15.404-4 and DFARS 236.606-70 provide additional guidance. The record of negotiations and the government estimate must clearly show that the cost of direct design services does not exceed the six percent limitation.

The following are examples of A-E services that are not considered an integral part of direct design services for a military construction project and should be EXCLUDED from the A-E fee when determining compliance with the six percent limitation. These services, as well as direct design services, should be funded from the planning and design (P313) account:

- (1) Initial site visits.
- (2) Field, topographic, property, boundary, utility, and right-of-way surveys.
- (3) Subsurface explorations and borings, soils and materials testing, and resultant reports.
- (4) Flow gaugings and model testing.
- (5) Reproduction of design documents for review purposes.
- (6) Preparation of construction cost estimates.
- (7) Comprehensive interior design (CID) services.
- (8) Preparation of general and feature design memoranda.

- (9) Models, renderings, or photographs of completed designs.
- (10) Construction phase services.
- (11) Preparation or verification of as-built drawings during construction.
- (12) The services of consultants not specifically applied to the preparation of designs, plans, drawings, or specifications for a project.
- (13) Preparation of general and development criteria not specifically related to a military construction project.
- (14) Management and contract administration of A-E services contracts in connection with services excluded from the six percent limitation.
- (15) Document reproduction, travel, and per diem costs in connection with services excluded from the six percent limitation.

The following A-E services are considered 'advanced planning' and must be funded from the operations and maintenance account:

- (1) Developing a master plan for an installation.
- (2) Developing the requirements for a military construction project.
- (3) Alternative site studies.
- (4) Developing and validating military construction project documentation prior to commencing project design.
- (5) Preparing engineering analyses and studies to develop technical design parameters.
- (6) Preparation of as-built drawings of existing facilities prior to subsequent renovation or alteration project.
- (7) Preparing environmental impact assessments, statements, and supporting data.

(8) Management and contract administration of A-E services contracts in connection with the above services.

(9) Document reproduction, travel, and per diem costs in connection with the above services.

2.3.4.2 Selection Process

The selection process for acquiring A-E services is initiated by a public announcement, as required by the Brooks Act. Public Law 92-582, as amended, establishes a policy directing each agency to “publicly announce all requirements for architectural and engineering services and to negotiate contracts for architectural and engineering services on the basis of demonstrated competence and qualification for the type of professional services required and at a fair and reasonable price.” The Commerce Business Daily (CBD) is the public notification media by which the U.S. Government agencies identify most proposed contract actions and contract awards. Public announcement requirements are broken into two categories:

- (1) Fees expected to not to exceed \$25,000. The contracting officer shall comply with FAR 5.101(a)(2) and 5.205(d)(2). The public announcement requirement is satisfied by posting an unclassified notice of the solicitation in a public place, on an electronic bulletin board, on any other appropriate electronic means located at the contracting office, or any of the additional methods identified in FAR 5.101(b). The notification shall be posted not later than the date the solicitation was issued and shall remain posted for at least 10 days or until after the quotations have been opened, whichever is later. However, if there is no response in 10 days, a synopsis of the project should be placed in the CBD.
- (2) Fees expected to exceed \$25,000 (including phases and options). FAR 5.101 and 5.205 require that the proposed contract actions will be synopsized in the CBD to allow a 30-day response time from the date of notification of intent, except when exempted by FAR 5.202.

It is the project manager's responsibility to provide the Contracting Officer sufficient information for the synopsis. The Contracting Officer will prepare and send the synopsis to the Department of Commerce. Each notice publicizing procurement of A-E services is listed under “R. Architect-Engineer Services.” The project must be listed with a brief statement concerning the following:

- (1) **Location**, where work will take place and security level.
- (2) **Cost** of the service required.
- (3) A-E selection evaluation criteria that is project specific and includes the criteria items identified below are listed in the relative order of importance to the Government. Use the information in the DD Form 1391 and other pertinent project data in determining the appropriate evaluation criteria.
- (4) The type of construction delivery strategy to be used for the project; i.e., design-bid-build, design-build, or turnkey.
- (5) The construction cost limitations (or cost range).
- (6) The type of contract proposed; e.g., firm fixed price.
- (7) The estimated start and completion dates.
- (8) The date by which responses to the notice must be received, including submission of SF Form 255, Architect-Engineer and Related Services Questionnaire for a Specific Project, if required.
- (9) Appropriate statements shall be made concerning any specialized qualifications, security classifications, and limitations on eligibility for consideration. A standard CBD (numbered note 24) can be used instead for writing evaluation criteria, if the note satisfies the specific needs.
- (10) The location of the firm in the general geographical area of the project may be an evaluation factor. However, all firms responding to each advertisement will be considered for selection, unless the CBD announcement states that only those firms in the geographical area will be considered. Qualified A-E firms with SF Form 254, Architect-Engineer and Related Services Questionnaire, on file can also be considered.

The A-E selection evaluation criteria should include the following significant items in accordance with FAR 36.601-1, DFARS 236.602-1, AFFARS 5336.602-1, and AFI 32-1023:

- (1) Professional qualifications necessary for satisfactory performance of required services.
- (2) Specialized experience and technical competence in the type of work required, including, where appropriate, experience in energy conservation, pollution prevention, waste reduction, and the use of recovered materials.
- (3) Capacity for timely accomplishment of work.

- (4) Past performance on contracts with government agencies and private industry in terms of cost control, quality of work, and compliance with performance schedules. Use performance evaluation from the Architect-Engineer Contract Administration Support System (ACASS). See Section 2.3.11 of this AFPAM for details on ACASS. Consider superior performance evaluations on recently completed DoD contracts.
- (5) Demonstrated knowledge and application sustainable design principles, including prescribing the use of recovered materials and achieving waste reduction and energy efficiency in site, facility, and landscape design.
- (6) Location in the general geographic area of the project and knowledge of the locality of the project; *provided*, that application of this criterion leaves an appropriate number of qualified firms, given the nature and size of the project.
- (7) Volume of DoD work the firm has done in the past 12 months (required by DFARS 236.602-1).
- (8) Acceptability under other appropriate evaluation criteria.

2.3.4.3 A-E Selection Boards

A single, formally constituted Selection Board is required for the selection and award of a contract where the expected A-E fee is less than \$25,000. Two formally constituted boards, the Pre-Selection Board and the Selection Board are required whenever the expected A-E fee is \$25,000 or greater.

The responsible Air Force Civil Engineering official nominates members for the required board(s). No member can serve on both boards when two boards are required. Each board shall have a minimum of three or more members of the CE staff appointed on the basis of technical experience and maturity of judgment. A non-voting member from the contracting officer shall be invited. A non-voting recorder shall be appointed and shall be present during each board meeting to record discussion of evaluation criteria and board results. The chairperson of the Pre-Selection Board should be a registered professional engineer, a registered architect, or a certified planner, if possible. The chairperson of the selection board must be a registered professional engineer, a registered architect, or a certified planner. Selection boards shall develop a point system to evaluate potential A-E firms in accordance with AFFARS 5336.602-1.

The pre-selection board develops and adopts an evaluation procedure and conducts an evaluation. Evaluation is based on qualifications data maintained on file for up to one year and data submitted by firms responding to the CBD announcement. The chairperson briefs the members on the evaluation procedures and point system. To ensure objectivity, each firm will be evaluated on the information contained in the SF Form 254s, the SF Form 255s, the DD Form 2631 (ACASS evaluation), the ranked A-E selection evaluation criteria, and other data required in the CBD synopsis or other public notification. The pre-selection board must rank the selection evaluation criteria in the order identified in the public announcement; each selection criterion item must be equal to or less than the criterion item listed above it. When complete, three to six qualified A-E firms should be recommended to the selection board.

The selection board makes recommendations for final selection from the list provided by the pre-selection board. The chairperson briefs the members on the evaluation process and point system, and the selection board develops its own evaluation procedure of the short-listed A-E firms. The selection board conducts its evaluation based on the same materials considered by the pre-selection board, plus interviews. The selection board must conduct interviews with the top three firms under consideration as part of their evaluation process. These interviews may be conducted by telephone.

The chairperson submits a summation of all board actions, identifying the top-ranked firms (minimum of three) in descending order as the best qualified. The summation, all evaluation forms, and minutes are annotated **FOR OFFICIAL USE ONLY AND BECOME PART OF THE OFFICIAL CONTRACT FILE**. The report serves as authorization for the Contracting Officer to commence negotiations in accordance with FAR 36.606.

If the expected A-E fee is less than \$25,000 and no pre-selection board is required, the selection board is responsible for all evaluation activities normally performed by the pre-selection board.

The following documents, based on the above mentioned criteria will be prepared and filed for each A-E contract awarded:

- (1) statement of work,
- (2) orders of pre-selection/selection board,
- (3) pre-selection/selection board minutes,
- (4) the top three to six firms are submitted to final selection board, the board worksheets indicating rationale as to how criteria elements were applied and,
- (5) SF Form 254s (and SF Form 255s, when required) of the final top three selections.

2.3.4.4 Open-end Contracts

Indefinite Delivery Indefinite Quantity (IDIQ) contracts can be used when the base has a variety of small and recurring requirements, including maintenance, repair, and minor construction. However, a definite statement of work cannot be produced prior to the contract and the precise quantities of A-E services needed during the contract period cannot be made. IDIQ contracts must comply with procedures for selection for fees greater than \$25,000 (two selection boards).

There is no prohibition to awarding more than one IDIQ at a given base. Current IDIQ contracts include the initial contract year, plus four option years. Maximum fee limitations are \$750,000 per contract year and \$299,000 per delivery order. The initial delivery order in any contract or option year is limited only by the contract year amount. When multiple A-E contracts are awarded from one solicitation, the maximum fee limitations apply separately to each contract.

HQ USAF/ILE and SAF/AQC may grant waivers to these limitations when justified by unusual circumstances and requirements. The number of IDIQ contracts a base may have in place generally is limited only by the requirement that sufficient A-E workload exists to justify the multiple contracts.

2.3.4.5 Contract Negotiation

Upon approval of the A-E selection, the contracting officer and project engineer, or designated representative as technical advisor, meet with the A-E of highest priority selected and attempt to negotiate an equitable contract. If satisfactory negotiations cannot be concluded with the top ranked A-E, the negotiations are formally terminated and initiated with the A-E of second highest priority.

2.3.5 *Pre-Design Conference*

The pre-design conference is scheduled to ensure all interested agencies have an initial input into the project design at an early stage. The greater the number of agencies involved, the greater the chances of conflict between the requirements of each. Conflicts in requirements should be resolved at this conference. Later, as the design process progresses, the changes become more expensive (See Section 2.4 of this AFPAM for guidance on the entire design review process).

It is the project designer's responsibility to decide which agencies should be involved in the pre-design conference and the formality of that conference. Smaller projects need only a single meeting with only the using agency. A key to efficient design is to bring in the other engineers who will be working on the project as soon as possible. This allows them to "get a feel" for the project, present any of their ideas for incorporation which may affect the work of others, and prepare the best possible work schedule for the design.

The lead project designer should coordinate and schedule other engineers on the project to attend the pre-design conference. Of paramount importance is the constant close contact with all members of the design team. Communication among team members will reduce the potential for error caused by overlapping of each discipline's requirements and will also enlighten the engineering staff regarding some of the problem areas faced by the team members.

The project designer has three main tasks for the pre-design conference.

2.3.5.1 Conference Set-up

The first task is to set up the pre-design conference and inform all agencies of the time and place. The number of agencies will determine the location of the conference. The best location for a pre-design conference is at the site or at the using agency if that agency can accommodate the number of people. Notification for the conference should be by letter with a lead time of a week to ten days. If time permits, a courtesy follow-up phone call is usually appreciated. The list of attendees will vary with each project. As a minimum, the following list of agencies should be invited to attend:

- (1) using agency or agencies (all projects);
- (2) project engineers (all disciplines involved);
- (3) construction inspector/QAE for the project;

- (4) the A-E Firm representatives (if used)
- (5) Environmental Flight;
- (6) Fire Protection Flight (on most projects);
- (7) Operations Flight (especially, the affected shops);
- (8) Base Communications;
- (9) Bioenvironmental (optional); and
- (10) Others: This might include the Base Safety Office (Ground/Flight), Security Forces, and Base Operations, as needed.

2.3.5.2 Conference Preparation

The second task of the project designer is to prepare for the pre-design conference. In preparing for the pre-design conference, the project leader should keep in mind the goals of the conference.

The conference should ensure the project requirements, as identified in the programming documents, are current and valid. It should determine the flexibility of the cost identified, if any, based on the project designer's preliminary cost estimate. If a discrepancy of greater than 25 percent is discovered between this estimate and the programming document, the project designer/manager must immediately consult with Base Development for re-accomplishment.

The pre-design conference should also identify any further requirements which may be applicable to the project. These include the base Architectural Compatibility Standards and Interior Design Standards that may impact the project. Base Development can also supply any other requirements for the facility. Any work orders which can be incorporated with the design should then be included. Any conflicts which may arise concerning the project should be resolved and points of contact for any future information needed should be identified.

The final goals of the pre-design conference are the determination of the need for project phasing; ensuring critical facilities or components are identified; and determining if asbestos, lead based paint, or other environmental issues are present in this project. The currently established procedures for Environmental Impact Analysis Process (EIAP) must also be followed.

2.3.5.3 Conduct the Conference

The third task of the project designer, during the pre-design conference, is to chair the meeting and record the pertinent discussions. Upon opening the conference, the project designer will obtain a roster of attendees, briefly defines the

project scope, and state any possible problem areas which have already been identified.

The meeting should then be open for discussion on the project requirements or any other problems or concerns that should be addressed. The meeting should be brief and concluded as soon as the conference goals are met. The result should be a binding decision on all major points and identification of open questions which may require resolution at the conceptual design stage.

Following the conference, the project designer (in-house or A-E) will write the minutes and include a copy in the project folder. The minutes should include:

- (1) the project number;
- (2) the title (should agree with DD Form 1391);
- (3) the date of the pre-design conference;
- (4) the list of attendees;
- (5) the original scope;
- (6) the changes in scope (if any);
- (7) the problem areas identified;
- (8) a brief summary of the information presented and discussed;
- (9) a list of open items;
- (10) any completed checklists, and;
- (11) an estimate of conceptual design completion date.

2.3.6 *Project Design to Conceptual Stage*

Following the pre-design conference, the project designer should now take the information from that meeting, together with all the resources at-hand, and outline a plan of attack. This plan should include what needs to be done and in what order to accomplish the task and what assistance will be required from others. The site should be visited frequently during design. These visits aid the project designers in gathering and using accurate information and also provides the Civil Engineer visibility to the using agencies. This should also be done on A-E-designed projects. Validation that all existing conditions have been addressed is critical. All dimensions and locations on as-builts must be verified. At the conceptual design stage, the project should be well scoped. What needs to be done should be identified, as well as the requirements to be delineated.

2.3.7 *Continuation of Design*

Once the conceptual design stage is reached, the remainder of the design effort should be accomplished as set out by the project designer. Specifications, drawings, cost esti-

mate, and design analysis should be concurrently developed. When drafting assistance is required, the project designer should accurately sketch and label the drawings to be given to the team engineering assistant. The engineering assistant should not have to make decisions. The project designer should do this prior to handing work over to the team.

When writing specifications, the title and project number must agree exactly with the DD Form 1391. Specifications are to be prepared using office master specs, Corps of Engineers (COE) specifications, or Navy Facilities Engineering Command (NAVFAC) specifications, or appropriate commercial specifications. COE and NAVFAC specifications are available in the Construction Criteria Base (CCB) database. The National Institute of Building Sciences (NIBS) maintains the CCB. The CCB is available on the NIBS web site at <http://www.nibs.org> or by CD-ROM and DVD distributed quarterly by NIBS. The date, drawing numbers, and titles referenced must agree exactly with the drawings. If the section required is not available, one should be prepared and edited for the master specification collection and saved for future use. Reference publications must be the latest issue and there cannot be duplicate contract clauses in the specifications.

For expediency, the preferred method is to appropriately specify an item on the drawings. Specifications should reflect well researched and well thought out decisions. It is the responsibility of the project designer to question unfamiliar items.

After specifications are completed, the project designer should proofread the specifications to ensure correctness prior to preparation of project packages. If errors are found in master specs, they should be corrected on the master. Before corrections to the masters are made, the Chief of Contracts should be contacted for approval to make the changes.

The saying, "a picture is worth a thousand words," holds true for contract drawings. They are used to relay information and instructions to the contractors. If a drawing does not read well, it is practically useless. Drawings should be clean and concise. Detailing should be sufficient to explain the desired finished construction product.

All drawing packages should contain a location plan. All views should be clearly marked: floor plans, elevations, sections, and scale. Drawing numbers are obtained by the team's engineering assistant and entered on each sheet. Each sheet should be titled and the number of drawings should be kept to a minimum.

The AF Form 66, Schedule of Material Submittals, is mandatory for all projects requiring submittals. This constitutes notice to the contractor of their requirements for submittals. All submittals required in the specifications should be listed and the contract reference and the number of copies required of each submittal specified. The submittals required in division one of the specifications must be included. Four copies are required of all submittals, except for samples, which require only one set.

There are three types of cost estimates: programming estimate, rough estimate, and final cost estimates. All projects are subject to approval limits and/or statutory limits.

Programming estimates are those reflected on the programming documents (DD Form 1391 or AF Form 332). These are initial estimates based on historical cost data developed early in the process to "get the ball rolling."

Rough estimates are those at the conceptual design stage. The prime purpose of these estimates is to determine an estimate closer to real costs using the additional information of the conceptual design. These are budget estimates based on parametric cost estimates generated by the Air Force Parametric Cost Estimating System (PACES) or similar software or based on historic cost data. Discrepancies between this estimate and the AF Form 332 or DD Form 1391 greater than 25 percent will require the work approval document to be revalidated by Base Development. The accuracy of this rough estimate is generally about ± 20 percent.

The final cost estimate should be accomplished on the AF Form 3052, Construction Cost Estimate Breakdown, or an approved electronic equivalent and reflect material and labor estimates by specification divisions. Costs for contractor's overhead and profit are included. Standard percentages are 15 percent overhead and ten percent profit. The accuracy of this estimate should be about plus or minus ten percent. This estimate represents a professional as-

assessment of the project costs. The AF Form 3052 should be signed and dated by the project designer. The AF Form 3052 should be marked *For Official Use Only (FOUO)*.

Several factors beyond the control of the project designer can adversely affect the accuracy of cost estimates. Some of these are economic conditions, number of bidders, visibility of the project, and time of the year.

A complete design analysis for all projects must be included in the project folder (the A-E can provide a more detailed description) including all calculations performed in the design of the project; i.e. square footage, heat loads, and structural design. The project designer must ensure all design information is collected from the other engineering disciplines and included in the project file.

Upon completion of first complete draft of drawings and specifications, the project is at the final design stage.

2.3.8 *The Final Design Review*

Once the drawings, specifications, and the AF Form 3052 (final cost estimate) are completed, the engineer will prepare a final review package.

The package should be sent to Base Contracting, Environmental Flight, Operations Flight, Fire Protection Flight, Bioenvironmental, Communications Program Management, Ground Safety, Security Forces, Corrosion Engineer, and the using agency. If the project designer requires a final design review meeting, the package is sent ten days prior to the scheduled time and place of the meeting.

At the final design stage, there should be no design changes. If the design team did a good job keeping the user(s) involved, changes should be limited to clarifications, misspelled words, and typos. Any other change will require written justification from the requester. Changes will be accepted only if it is a result of equipment or mission changes and after approval of a work request (AF Form 332).

If a final design review meeting is held, the final review comments should be incorporated on a working copy of specifications and drawings. A formal review meeting should be a methodical progression, section-by-section, of the project specifications or drawing, sheet-by-sheet, making comments on each. Any potential conflicts should be

settled while all parties are present. The result of a final design review meeting is a marked-up copy of specifications and drawings showing all necessary changes required by each reviewer with their assurance that they will sign when changes are incorporated.

2.3.9 *Authority to Advertise*

The project designer will be notified by the Chief of Contracts once authority to advertise the project is received. The project designer should obtain the specifications, do a final review/update, and make arrangements to have them sent to reproduction. Drawings will be reproduced and assembled for delivery to base contracting. The engineer will prepare the standard cover letter and package to send to base contracting requesting advertisement. In preparation of the package, the project designer should know liquidated damages include, but are not necessarily limited to, the cost of inspection and any loss of revenue of the using agency which is caused by a construction delay. The construction time must be adequate. It should not be unusually compressed or lengthy and construction time should be adjusted to take into account statistical data on the weather.

2.3.10 *Other Duties after Design*

The project designer's responsibility extends throughout the construction process to project completion.

Potential bidders will have a chance to visit the project site prior to submitting bids. The project designer and/or the Contracting Officer will escort the prospective bidders and answer questions they may have. The outcome of the site visit may be the identification of some discrepancies in the project documents. If there are discrepancies, the project designer will be required to prepare an amendment to the project (See Section 2.5.3 of this AFPAM for guidance on amendments).

The project designer should attend the bid opening on the project, and obtain a copy of the bid abstract from contracting. The project designer should then report the bid results to the Chief of Contracts on the day of the Bid Opening, and prepare a message requesting funds to award the project.

Once a contractor has been selected and approved, a pre-construction conference is held to inform the contractor of what is required while operating on the base and to clarify any questions the contractor may have on the project documents.

The progress schedule is the contractor's estimate of the work schedule. The project designer is required to briefly review and initial it for adequacy. The Chief of Contracts approves the project progress schedule.

The specifications of a project usually require the contractor to submit samples, technical data, manufacturer's instruction, etc., for the project designer to evaluate in terms of compliance with the specifications. Using the AF Form 3000, Material Approval Submittal, the project designer should evaluate the submittal, approve or disapprove (explaining fully the reasons for disapproval), and should also signify any decisions made on color, size, etc. All submittals involving colors should be made at one time to ensure a coordinated color scheme. Color selections must meet the base architectural and compatibility standards. All submittals should be returned to the construction inspector/QAE assigned to the project within five days.

The project designer shall make a point to visit the project site at least once a week. There are valuable lessons that can be learned in viewing the transformations from drawings to reality. If the project designer notices a discrepancy, it should be brought to the attention of the construction inspector/QAE and not be handled between the project designer and the contractor. Engineers and/or architects are not authorized to direct the contractor to make any changes.

A modification is a formal change to the contract after it has been awarded. (Refer to Section 2.6.3 of this AFPAM for preparing a contract modification.) Changes on projects that were designed by an A-E require different treatment. (See Section 2.9 of this AFPAM for additional details on A-E Liability).

2.3.11 Post-Design/ Post-Construction/ Post-Occupancy Evaluations

Mistakes have been and always will be a part of project design, construction, and occupancy. Mistakes should not be repeated. Project mistakes should be a learning experience.

If an A-E was used to design a project, a post-design evaluation should be prepared by the project manager. The DD Form 2631, Performance Evaluation (Architect-Engineer), should be completed and kept on file. A copy of this completed form should also be sent to the Chief of Contracts and base contracting so that the information on the A-E's performance can be compiled and briefed to oth-

ers. Finally, in accordance with DFARS/236.201, a copy must be sent to the Army Corps of Engineers (COE) at the following address:

U.S. Army Engineer Division, North Pacific
ATTN: ACASS Center
P.O. Box 2946
Portland, Oregon 97208-2946
Telephone: (503) 808-4590/4591

The COE will load this information into their Architect-Engineer Contract Administration Support System (ACASS) to evaluate and share performance appraisals with all government agencies. More information about ACASS is available via the Internet at:

<http://www.hq.usace.army.mil/CEMP/E/ES/ACASSWEB/index.htm>

A post-construction evaluation of the contractor's performance should be prepared jointly by the project designer and the project construction inspector/QAE. These two individuals should record and file the "lessons learned" on the project. The DD Form 2626, Performance Evaluation (Construction), should be completed and kept on file. A copy should also be given to the Chief of Contracts and base contracting so that the information on the contractor's performance can be compiled and briefed to others. Finally, in accordance with DFARS/236.201, a copy must be sent to the Army COE at the following address:

U.S. Army Engineer Division, North Pacific
ATTN: CENPD-CT
P.O. Box 2870
Portland, Oregon 97208-2870
Telephone: (503) 326-3459/4910

The COE will load this information into their Construction Contractor Appraisal Support System (CCASS) to evaluate and share performance appraisals with all government agencies. More information about CCASS is available via the Internet at:

<http://www.hq.usace.army.mil/cemp/e/es/ccassweb/index.htm>

A post-occupancy evaluation should be conducted on all projects. A properly-executed, post-occupancy evaluation can yield valuable insight into future design. A post-

occupancy evaluation should include all users (not just the decision makers) and those who are responsible for maintaining facilities.

2.3.12 *Summary*

The project designer's responsibility on a project far exceeds design duties. Responsibility is throughout the project cycle from inception to completion. Proper discharge of this responsibility will yield a product of which an engineer or architect can be proud.

2.4 **Design Reviews**

The design team leader is responsible to the Chief of Contracts for managing the design review process on all assigned projects. A systematic approach to conducting design reviews must be established or available in operating instructions to ensure uniformity. MAJCOM guidance for design review of special or complex projects is generally available in MAJCOM and AFCESA issued Engineering Technical Letters (ETLs), or Construction Technical Letters (CTLs).

2.4.1 *Design Review Types and Purposes*

All projects are reviewed by several functional agencies throughout the design process. During design reviews, all comments provided by functional agencies should be submitted in writing.

In the functional review by the using organization, the project designer guides the customer through the entire design process to help the customer fully understand the drawings and specifications in relationship to their requirements. This ensures the customer knows what they are getting.

During the contracting review, the project documents, complete with drawings and specifications, are reviewed by base contracting. When Contracting returns the project review comments, the appropriate comments are incorporated in the design package by the project designer. The project designer sends a reply to Contracting indicating the action taken on each comment. It is essential to the success of the entire design process that Engineering and Contracting work together to accomplish mutual goals.

The Operations Flight review is to ensure the design drawings and specifications meet operability and maintainability requirements. This review is typically handled by the Maintenance Engineering Element. The Operations Flight determines if contract maintenance is required or the

hiring of additional personnel is necessary to perform maintenance. The review also ensures building system components are easily accessible for routine maintenance and replacement. Experienced facility maintenance personnel ensure designs do not include specifications of a system that would be non-maintainable. One objective of the project design is to select systems, components, and arrangements which reduce future maintenance. Such facility systems include exterior and interior finishes, windows, and roofs for buildings. Maintenance points and maintainable controls for mechanical systems and adequate shutoff points and looping for utilities distribution systems are considered. Stormwater drainage, adequate edge containment techniques for pavements, and corrosion control for buried systems and components are reviewed.

The Fire Protection Flight review ensures the drawings and specifications meet fire safety, life safety, and code compliance. They also ensure the design meets local fire fighting operational requirements (i.e., accessibility to facility, location of fire hydrants, etc.).

The Constructibility Review by the construction inspector/QAE for the team assigned to the project ensures the contractors can determine, from the project specifications and drawings, exactly what the project designer wants built or repaired and how that repair or construction should take place. The goal of the review is to both reduce the likelihood of delays in bid openings or potential modifications during construction which cause wasted effort, higher construction costs, subsequent contractor claims, increased administrative effort, and delayed contract completion. Prepare the Construction Review using AF Form 2519, All Purpose Checklist, and the list of items as identified in Attachment 2 of the pamphlet.

The Final Review is conducted by the Chief of the Engineering Flight and the Chief of Contracts.

The BCE review is made of the completed drawings and specifications after all previous reviews have been completed and applicable review comments incorporated. The Base Civil Engineer conducts the review with the assistance of the Deputy Base Civil Engineer, Chief of the Engineering Flight, Chief of Contracts, and the project designer (as required).

The **Command reviews** projects on a selected basis, usually to ensure site adequacy based on site investigations, provision of special technical requirements, adherence to Air Force criteria, correction of design errors and omissions before contract award, safety and fire protection, reliability and maintainability, energy efficiency, structural integrity, and constructibility. MAJCOM ETLs provide guidance as to when this review is required and the Chief of Contracts informs the project designer when this review is applicable.

NOTE

The user's functional review, Operations Flight review, and Fire Protection Flight reviews could entail large scope changes if the project does not meet applicable criteria at the final design stage. The project designer must ensure that these inputs are received at the conceptual design stage review to keep the project on schedule and eliminate false starts.

2.4.2 *Design Submittals*

Submittals for large, complex projects will be forwarded by official correspondence to the appropriate reviewing offices. It is the project designer's responsibility to ensure the customer is notified when their project is available for review.

2.4.3 *Design Review Stages*

The design process begins with a site visit and the pre-design conference, scheduled and documented by the project designer. The project designer ensures all appropriate project approval documents (i.e., AF Form 332 or DD Form 1391) have been completed. The purpose of the pre-design conference is to ensure all requirements are identified. It also initiates environmental actions including asbestos/lead surveys, a review to determine any required permits, and the Environmental Impact Analysis Process, if required. Refer to paragraph 2.3.4 for detailed guidance on purpose and representations required to attend the pre-design conference. The design should be reviewed at the conceptual, intermediate (if applicable), and final design stages by the Operations Flight, Fire Protection Flight, Environmental Flight, the corrosion engineer, the using organization, base communications, Safety Office, Security Forces, Bioenvironmental, Base Contracting, and BCE, as appropriate.

2.4.3.1 *Concept Design Stage*

All projects, whether designed in-house by the government or by A-E, will have a conceptual design review at the conceptual design stage. The purpose of the conceptual design

review is to provide all concerned parties the opportunity to review and comment on the design approach, and methods and proposed solutions to approved facility projects.

It is essential for customers to participate early in the programming stage, become involved during concept development, and ensure all their requirements are included in the final concept design. This final concept design is the last chance for the customer to input user requirements, except for necessary mission changes. The project is considered at the conceptual design stage once the final concept design is approved.

The ultimate goal of concept design review is to avoid costly changes in the latter stages of design or during construction. A thorough functional review must be made to ensure all functional requirements are efficiently and effectively provided.

The conceptual design review is not a forum for introducing new work requirements or changing the scope of the project. Use Cost Control During Design measures to resolve all scope and cost differences before proceeding with design. Take whatever measures are necessary to incorporate all essential project requirements into the basic project design package; incorporate supplemental requirements or necessary scope reductions as bid options. If it becomes necessary to alter the project scope by plus or minus 25 percent or increase the project cost by more than 25 percent, these new requirements must be processed and approved by the appropriate authority before proceeding with project design. This usually requires a revision to the AF Form 332 or DD Form 1391 by the Base Development Element and possibly approved by a higher authority. Consult your Base Development Element for direction and guidance.

The conceptual design review should always occur prior to detailing civil (structural), architectural, electrical, or mechanical systems. However, the project designer must have thoroughly reviewed the work requirements (AF Form 332 and DD Form 1391) and formulated design approaches, concepts or plans. The basic features, materials, systems, and related costs necessary to meet the financial requirements of the project must be established. In advance of the design review, the project designer must prepare concept drawings or sketches (i.e., floor plans, elevations) and word

descriptions defining and describing the major or significant elements of the project design. In addition, an outline of the specifications to be used, a preliminary cost estimate, and the basis of design (including design assumptions, preliminary calculations, life safety analysis, and energy conservation inputs) shall be provided.

At the conceptual design review, the environmental flight representative annotates whether any environmental permits are required. The environmental flight is responsible for ensuring applications for appropriate environmental permits are made and/or issued before the design reaches completion. Most permits are identified when the Certificate of Compliance is prepared along with the DD Form 1391. The project designer is responsible for ensuring the application for appropriate permits are made and/or issued before reaching design completion. The asbestos/lead survey test results, required by the designer at the pre-design stage, are reviewed. If asbestos/lead has been discovered, it is handled in a method approved by the environmental flight. It is extremely important the project designer ensures that this survey is completed and resolved prior to the intermediate design stage. Other areas of environmental concern also involve potential equipment that could produce greenhouse gases, contain ozone depleting substances, or contain materials that could be recycled or recovered.

The project designer is responsible for documenting minutes of the design review meeting and having all attendees sign an attendance roster. The original meeting minutes, with all the design review documents, will be forwarded to the Chief of Contracts for review and then filed in the project folder. Copies of the minutes should be sent to all attendees to ensure their concurrence.

The project designer notifies attendees of the conceptual design review and ensures the comments are received several days prior to the review meeting. The meeting should be used to answer open questions and to discuss and resolve any other items which could present problems.

All conceptual design reviews should be attended by the project designer, the customer single point of contact, the project programmer, the Fire Protection Flight representatives, the Operations Flight representative, the Ground Safety Officer, the Bioenvironmental Engineer, the Communications representative, the Environmental representa-

tive, and the Security Forces. Depending on the size of the project, it may be appropriate for others to attend. The project designer will determine if the Base Contracting representative, Community Planner, and Energy Officer should be invited.

If the project requires MAJCOM technical review, a determination made by the Chief of Contracts, the project documentation will be forwarded to Command. The packages for command technical review should be prepared in accordance with MAJCOM instructions. A copy of the DD Form 1391 drawings, specifications, design analysis, bid schedule, performance schedule, and other supporting documentation should be forwarded.

If the review process is conducted properly, last minute design changes should be unnecessary and costly redesign efforts will be avoided.

2.4.3.2 Intermediate Design Stage

At the intermediate design stage, the representatives from all the organizations who sign the drawing cover sheets at the final design stage and Contracting receive copies of the submittal for review. The choice of whether to include an intermediate design review should be based on the project requirement and the user. For example, a project that is entirely electrical or mechanical in nature probably doesn't require an intermediate design review, due to the specialization of work involved. An architectural project that includes exterior/interior finishes, layouts, etc. almost always requires an intermediate design review.

2.4.3.3 Final Design Stage

When the drawings and specifications are complete, a government cost estimate is prepared (AF Form 3052 or equivalent), and the project designer prepares a final review package. This package is then distributed to each organization that is required to sign the cover sheet for their review.

At the final design stage, there should be no design changes. Changes should be limited to clarifications, misspelled words, and typos, if any. Any other change requires written justification from the requester. Changes will be accepted only if it is a result of equipment or mission changes and after approval of a work request (AF Form 332).

The result of a final review meeting will be a marked-up copy of specifications and drawings showing all necessary

changes required by each reviewer with their assurance that they will sign the 100 percent project design drawings when changes are incorporated.

2.4.4 *Signatures*

After incorporating the agreed upon final review comments, the team engineering assistant ensures the drawings are signed by all of the reviewing agencies. The Chief of Contracts ensures the PCMS/PM reflects the final design status. If this is a MILCON or P341 project, CWE funds required must not exceed the 125 percent of the programmed amount (PA) shown on the DD Form 1391. If the CWE exceeds 125 percent of the PA for projects in those funding categories, reduce the design requirements or reprogram the project. For other projects, the funds required should be within 25 percent of figures on the DD Form 1391 or AF Form 332. If not, the approval document must be revalidated with Base Development. The project designer/manager is responsible for initiating action to ensure agreement of the figures. Once the drawings and specification are signed, the project is considered to be 98 percent designed. Once the contract package is completed, it is considered 100 percent and ready to advertise.

2.5 **Processing Funded Projects**

Processing of the completed 100 percent design package to contracting should be expedited upon notification the project has received funding authority or funds. Uniform procedures must be established to ensure contracting actions can be executed in a timely fashion.

2.5.1 *Typical Procedures*

Once the project has been approved and funding authorized, a project synopsis should be immediately forwarded to Contracting. Contracting will then determine the best avenue for awarding the contract.

The appropriate funding documents (usually an AF Form 9, Request For Purchase or equivalent) are then prepared and submitted to the Chief of Contracts for concurrence and the Chief of the Engineering Flight for signature. Many installations use the Automated Business Service System (ABSS) to complete and route these documents electronically. Upon approval, the funding documents are then forwarded to the Civil Engineering Resources Flight for processing. If the requirement is time sensitive, Resources should be notified that the funding documents will be quickly processed through the system. One set of the plans and specifications, along with the certified funding docu-

ments, should be delivered to Contracting within ten days of receipt of funding authorization.

Contracting then schedules the bid opening date and the Chief of Contracts is notified. The information is entered into the PCMS/PM database. Any delays in the scheduled bid opening should be immediately brought to the attention of the Chief of Contracts.

2.5.2 *Contracting Alternatives*

Many contracting methods are available to award a project. Contracting will need to evaluate the size of the project, the complexity of the work involved, and the estimated cost to determine which method to use for award.

2.5.2.1 Invitation for Bid (IFB)

The method used most frequently is the Invitation for Bid (IFB) process. This method invites all bidders to submit their lump sum cost to complete the work identified in the project drawings and specifications. This cost is based on the contractor's interpretation of the drawings and specifications. Government technical evaluations are not performed under the IFB method. At the bid opening, contracting will officially open the bids and announce the contractor submitting the lowest cost. Contracting then determines if the contractor has the manpower and resources to accomplish the work before awarding the contract to the lowest bidder.

2.5.2.2 Request for Proposal (RFP)

Another method gaining popularity over the IFB is the Request for Proposal (RFP) process. This method invites all technically competent bidders (or selective bidders) to submit their itemized breakout costs for completing the work identified in the project drawings and specifications. When proposals are received, contracting informs the Contracts Element of the results and one of two approaches can be taken to provide the best value for the government:

Tradeoff process. This process allows the government to consider award to "other than the lowest priced offeror" or "other than the highest technically rated offeror."

Lowest price technically acceptable source selection process. This process allows the government to consider award to the offeror that has the lowest price after being evaluated as technically acceptable.

Consult with your local contracting office for details on these RFP processes.

2.5.3 *Amendments*

An amendment is a change to the project prior to contract award. Amendments to drawings and specifications occur whenever a project has been solicited by contracting and questions or clarifications arise. It is the project designer's responsibility to ensure all requests for information received by Contracting are addressed quickly to prevent a delay in the award process.

Once a question is received, the project designer should examine the project specifications and drawings to determine the validity of the concern. If an error in the contract documents is evident and must be corrected, the project designer must prepare an amendment. If no design error exists and sufficient data has been furnished in the contract specifications and drawings, reply correspondence should be sent to Contracting explaining only a clarification is required and the clarification will be provided to the appropriate contractor.

If an amendment is required involving a cost increase, additional funding authority must be requested. If the project was locally funded, the request is coordinated with the CE Resources Flight. If it is a Command-funded project, a letter or message must be sent to the Command explaining why additional authority is needed. The amendment cannot be processed until the additional authority is received.

Once authority has been received or if no authority was required, the amendment is prepared using a standard format with a list of attachments tailored to the specific situation. Upon receipt of this information, Contracting prepares a Standard Form 30, Amendment of Solicitation /Modification of Contract, addressing the query and extends the due date for offers.

It is important to process contractor questions in a timely manner, ensuring project award process is not delayed. An amendment must reach Contracting at least ten days prior to the scheduled bid opening or the bid opening date will be extended.

2.5.4 *Bid Opening*

At the bid opening, the project designer should obtain the SF Form 1419, Abstract of Offers – Construction, from Contracting. The project designer then furnishes the bid results to the Chief of Contracts so the information can be forwarded to the Engineering Flight Chief, and the BCE.

The Chief of Contracts will ensure the bid results are accurately posted in the PCMS/PM database.

Contracting will request a technical bid evaluation via letter or two-way memo. If the project is an Invitation for Bid (IFB), and the low bid is within 15 percent of the Independent Government Estimate (IGE), the usual response is the bid appears to be valid. If the low bid is more than 15 percent below the IGE, an explanation of whether the contractor has included the entire scope must be provided. If the low bid is 15 percent higher than the IGE, the project designer must provide justification to Contracting with regard to the technical accuracy of the low bid versus the IGE. If the low bid cannot be substantiated, the solicitation will be canceled. A decision will then be made if the project will be rescoped and resolicited.

2.5.5 *Bid Evaluation*

Upon receipt of the project designer's technical bid evaluation, Contracting incorporates the response with their contracting validation results and determines if the low bid is valid. Upon validation, if the low bid was 15 percent higher than the IGE, a standard excessive bids e-mail form must be completed and provided to the Chief of Contracts for submission through the BCE to Command for requesting funds. The project designer should inform the Chief of Contracts and ensure the PCMS/PM database is updated with the bid validation date. If the project is MILCON or P-341, refer to section 2.8 of this AFPAM for additional information.

2.5.6 *Project Funding*

Command will fund most projects based on PCMS/PM data and send project money in the amount of the acceptable low bid to the base via funding channels. Some projects may also be funded locally by tenant units or other agencies. Resources will then process any funding documents to award or coordinate funding actions for locally-funded projects.

2.6 **Construction Management**

Construction inspectors or QAEs in the Contracts Element are responsible for construction management of assigned contracts providing surveillance, conducting inspections, and ensuring quality performance. The main responsibility of construction management personnel is to ensure the government receives quality and complete work as outlined in government or A-E produced contract documents (i.e., specifications and project drawings). This is accomplished through management procedures and policies that extend

from design through construction completion (cradle-to-grave). Policies must be established to facilitate quality construction and to monitor effectiveness of management techniques. All construction inspectors or QAEs must be familiar with all appropriate regulations, manuals, Construction Technical Letters (CTL's), and internal operating instructions pertaining to the Contracts Element. They conduct constructibility reviews of assigned projects prior to solicitation and coordinate all facility work with affected base organizations to minimize mission impact or to develop alternate operating procedures. They inspect construction sites at least once a day during routine work and during all phases of critical construction. Inspections will, at a minimum, address the following issues: construction and personnel safety, site cleanliness and control of debris and materials, communication with contractor superintendent, resolution of potential conflicts between users and base organizations, and monitoring the progress of construction.

The construction inspector/QAE maintains a contract folder to consolidate all contract information prior to and during construction. The inspector/QAE controls contract cost and performance growth rate through experienced foresight, attention to potential problems, and timely correction or contract modifications to ensure uninterrupted contract performance. The inspector/QAE looks for ways to reduce contract cost and/or performance period by deviations in contract specifications that would still satisfy the requirements of the project (i.e., value engineering concepts).

Modifications due to unforeseen site conditions should be executed as quickly as possible to prevent delays. Modifications due to design deficiencies should be identified and corrected as soon as possible to prevent increased cost due to removing deficient construction or expensive alterations to accommodate design. Modifications due to user change should be discouraged unless the facility under construction would not be usable without the requested change. When it becomes necessary to initiate a modification, the team leader and the Contracting Officer are notified immediately and the inspector should follow procedures identified in section 2.6.3.1 of this AFPAM.

Pre-final and final inspections are coordinated and conducted to include all parties having an interest in the completed project. Once construction is completed and ac-

cepted by the government, close-out procedures are initiated, including filing of all guarantee/warranty information.

Surveillance of completed projects is maintained to identify any latent defects or poor construction methods that might be apparent only after completion of construction.

2.6.1 Procedures

The following procedures cover the more significant actions required of the construction inspector/QAE in the management of contracted projects.

2.6.1.1 Constructibility Reviews

The purpose of the constructibility review is to improve construction contract performance by identifying errors and omissions in the drawings, specifications, and bidding documents. The contract inspector reviewers should concentrate on methods of construction, using the knowledge they have acquired from site and contractor visits to advise engineering of local methods and conditions that might deviate from specifications. Mistakes in the drawings and specifications often lead to wasted effort, requiring contract modifications, higher construction costs, contractor claims, and delayed contract completion. The construction inspector/QAE should perform the constructibility review along with the team leader and address the site conditions and restrictions; labor availability and skills; local material availability; local construction techniques; construction phasing requirements, including weather; demolition; long lead time for construction or equipment items; and special construction requirements (i.e., utility outages, street closures, etc.).

Various MAJCOMs have developed standardized constructibility review checklists similar to the HQ AETC checklist (see Attachment 2, Constructibility Checklist). When an item-by-item review is necessary, the reviewer marks the appropriate column on the checklist. The project designer coordinates the review comments and makes the necessary changes deemed appropriate. The original checklist and any other constructibility comments are filed in the project folder.

2.6.1.2 Project Documentation

The construction inspector/QAE ensures that all necessary contractual documents are assembled and placed in the project folder at contract award. All of the items shown in the project folder checklist form the official project folder documentation. If any item in the folder is missing, the

team leader will take actions required to secure the missing items.

The following contract records must also be included in the project folder:

- (1) a copy of the official DD Form 1391 or AF Form 332;
- (2) a copy of the Notice to Proceed;
- (3) a copy of the contract with all modifications (change orders), as they occur;
- (4) a copy of all test and lab reports;
- (5) all correspondence pertaining to the project;
- (6) daily construction inspection records (AF Form 1477, Construction Inspection Record, or an approved equivalent for each construction day for the life of the contract);
- (7) AF Form 3064, Contract Progress Schedule, (checked for front loading and coordinated with team leader before signing);
- (8) AF Form 3065, Contract Progress Report, prepared each Monday for the duration of the contract, coordinated with the contractor and signed with one copy to Contracting and one copy for the file folder;
- (9) AF Form 3000, Material Submittal Approval, processed for all submittals;
- (10) AF Form 103, Base Civil Engineering Work Clearance Request; and
- (11) additional documentation added as the project progresses to completion.

2.6.1.3 Contract Start

As soon as a project is awarded, the construction inspector/QAE assigned to that project will begin recording the construction progress data in PCMS/PM. When the pre-performance notice (also known as the pre-construction conference) is received, the team leader is invited to attend. Prior to the pre-construction meeting, the using agency is contacted to inspect the job site. Any problem areas or existing damage which is not part of the contract should be noted. Any phasing on the project that will affect the user's operation through moves, inconveniences, location of storage sites, etc., should be discussed. A memorandum for record stating any problems or damage noted is prepared.

Formal minutes from the pre-performance conference will be prepared by Base Contracting, with a copy forwarded to the construction inspector/QAE for inclusion in the folder.

Before commencing with construction, the contractor will set-up the construction site in accordance with the contract's construction site standards and notify the construction inspector/QAE of conditions not consistent with the contract.

2.6.2 *Contract Inspection Records*

The contract inspection documents include the AF Form 1477, Construction Inspection Record; AF Form 3064 Contract Progress Schedule; and the AF Form 3065, Contract Progress Report. These documents are an integral part of the contract execution and surveillance process. They constitute the legal record of the government position and version of contract events. They are used extensively as evidence in the negotiation and settlement of contractor claims and disputes. Utmost care must be taken to ensure these documents are correctly maintained and completely accurate.

All projects with a performance period over 59 days require an AF Form 3064 and AF Form 3065. An AF Form 1477 is also prepared for each day of the contract for projects with performance periods that exceed 59 days.

2.6.2.1 AF Form 1477

AF Form 1477, Construction Inspection Record, is the Inspector's diary, a log of the construction events on each project. It is an essential part of management and should provide an accurate story of the details of any project. Hence, the entries must be complete and accurate. At times, this diary, alone, can substantiate or disallow a contractor's claim if events are recorded promptly and properly. Disputes with the contractor, in many cases, are settled by the fact that requests of the contractor were recorded in the diary. The inspector will enter all data and information listed in the appropriate blocks of the AF Form 1477. All entries should be legibly entered in ink, made for each day of the week. In the event the contractor chooses not to work on Saturday, Sunday, or holidays, include the weather data and the notation "No Work Accomplished." For each day the contractor works, a daily inspection record is completed and the following elements included in the diary entries. Most of the information entered in the AF Form 1477 should be discussed and verified with the contractor to avoid any miscommunication or misinterpretation of events.

Diary entries include:

- (1) A description of actual work accomplished.

- (2) All work and materials approved/disapproved, including submission of AF Form 3000's, Material Submittal Approval.
- (3) Any unsafe conditions involving construction methods, storage of equipment, access to areas, etc. Include contractors' efforts to rectify them.
- (4) Instructions and interpretations of contract documents given to contractor, providing a detailed recall in case of potential conflict.
- (5) Interruptions and delays in operations, their cause and duration, and potential conflicts as a result of delays.
- (6) Data required with using organization on construction site and the reasons for interaction.
- (7) Any visits by government officials, industry representatives, base organizations (i.e., Safety, FD, Comm) by name, title, and reason for visit.
- (8) The use of photography as a means of documentation is highly encouraged. Pictures should be used to substantiate records of work accomplished, unsafe conditions, and work rejected. Photos should be stapled on each page with the date, time, subject, and signature. Photos are hard to refute and can be extremely valuable in contractor negotiations.

At the conclusion of a project, the construction inspector/QAE will make sure the AF Form 1477 is complete and reviewed by the Chief of the Section. The daily diaries are formally transmitted to the Contracting Officer for inclusion in their files. After one year, the project folder can be retired and sent to staging in accordance with current administrative procedures.

2.6.2.2 AF Form 3064

AF Form 3064, Contract Progress Schedule, is submitted to base contracting office within five days after the commencement of work or another period of time, as determined by the Contracting Officer. This form is prepared by the contractor and shows the order in which the contractor proposes to do the work. It also includes an area for dates on which the contractor contemplates starting and completing the several salient features of the work (including acquiring materials, equipment, etc.) The contractor will break down the phases into percentages of the total work complete, which will also serve as a proposal for payment.

Upon submission of the initial AF Form 3064, the Contracting Officer will evaluate the percentage of the total job

assigned to each work element. The following factors should be considered by the inspector when evaluating the feasibility of the contractor's proposal.

Particular attention should be paid to those elements performed in the early stages of the effort to preclude an overstatement that would result in an imbalance in payments for work performed (known as front loading).

For projects where much of the total project price is devoted to material acquisition, the contractor should separate the cost of materials from the installation and execution of the work. This process will guarantee the contractor is reimbursed for extensive front-end costs, while the government will be able to better gauge the overall execution of work.

The schedule should be in a logical progression of events and should not be designed to leave a large part of the critical elements of construction for the latter part of the performance period. Doing so may make it easier for the contractor to receive extensions without government compensation. Proposals for payment should be evenly spaced to avoid paying large amounts of the contract cost at one time.

The time period on the AF Form 3064 should match the contract performance period and the form should be accurately completed and signed by the contractor.

After all factors have been considered, the government will ask for clarifications and/or changes from the contractor, if needed. The construction inspector/QAE will recommend approval to the Contracting Officer. The inspector should then file the approved AF Form 3064 in the project folder. Any significant modifications to the performance period should include a revised AF Form 3064. Contracting should also ask for a revised AF Form 3064 any time the contractor falls behind schedule with proper justification, such as hurricane or a truck strike delaying equipment delivery. The inspector should use the AF Form 3064 as a tool to coordinate contract work with base organizations ahead of time. By knowing the periods of critical phases of construction, they can anticipate potential conflicts and work to alleviate them without contract delays.

2.6.2.3 AF Form 3065

AF Form 3065, Contract Progress Report, is used by both the contractor and the Contracts Element to report pe-

riodic performance to the Contracting Officer for the purpose of receiving compensation for work completed. The form lists all elements of construction, as itemized on AF Form 3064. The percentage of the total job assigned to that element will be listed next to each element.

The contractor and inspector will calculate the percentage of each element completed during a specific time period (weekly, in most cases) and, then, the cumulative percentage of the element completed to date. The inspector will concur or non-concur on the 3065. At the Contracting Officer's discretion and according to the payments clause of the contract, this information will be used for computing progress payments.

2.6.3 *Contract Modifications*

A modification is a formal change to a contract after it has been awarded. Modifications must be limited to those circumstances that: (1) would render the facility unusable from a functional standpoint or (2) are required due to major mission change rendering the original design inadequate.

Modification of contracts should only be considered if there is differing/changed site conditions, serious/major errors/omissions in design, mission changes, and/or safety/fire deficiencies. Before actions are taken to initiate a modification, the Contracting Officer should be notified of the problem. Project cost limitations and legal statutory limits should also be reviewed to make sure these limits are not exceeded.

If the change is user-requested, the user will submit an AF Form 332, BCE Work Request, for approval for the additional work prior to the change being executed. The project construction inspector/QAE will advise the project designer that a modification is required.

2.6.3.1 *Modification Procedures*

When it becomes known that a modification is required, the inspector, QAE, or project manager should first consult base development and determine if the change is within the scope of the programming documents and that no statutory limits will be exceeded. If no programming issues are encountered, an independent government estimate should be prepared if the modification involves a cost increase or decrease. If the change is not complex, this may be completed by the construction inspector/QAE. If it is beyond

the capability of the construction inspector/QAE, it will be handled by the project designer.

Technical approval must then be obtained for the modification. The BCE or Deputy BCE may have local approval authority for modifications under \$50,000. Commands may provide approval authority for changes above \$50,000 (Consult your MAJCOM for details). The letter format for command technical approval (and funding authorization request, if required) can be used. Each modification will be classified in the technical approval document as an unforeseen site condition, a design deficiency, a mission change, or a customer change.

Once technical approval has been received and an increase in construction costs is involved, funding authority or funds must be obtained to negotiate the modification with the contractor. The construction inspector/QAE will first check with the Resources Flight to establish if funds are available locally. Modification less than \$5,000, should be funded locally. If funds are not available locally, the construction inspector/QAE will prepare a letter to the MAJCOM requesting funding authority. If prior year funds apply, an Upward Obligation Letter (UOL) will be required. Approval for a UOL may take up to 14 days. Once the UOL has been processed and approved, the actual money is usually in hand. Current year funded projects usually only receive authority initially. For current year funds, the request for authority is included in the technical approval letter for modifications over \$50,000. If local funds are available, this reference would be deleted from the letter. For modifications under \$50,000, MAJCOM concurrence for current year funded projects must be requested.

Once funding authority or funds have been received for the modification, the modification package is prepared and the appropriate funding documents processed. If the change is within the construction inspector's or QAE's technical abilities, the representative will prepare the entire package from start to finish. Upon completion of the modification package, the construction inspector/QAE will then have the project designer review the modification package for completeness and accuracy. The project designer signs the AF Form 3052, Construction Cost Estimate Breakdown, and ensures it is stamped "For Official Use Only."

If the required change is beyond the technical abilities of the construction inspector/QAE, the representative will work with the project designer to develop the required changes in a timely manner. The project designer will develop a description of the changes, the AF Form 3052, revised drawings and specifications, if necessary, and the modification. The construction inspector/QAE, upon receipt of this information will complete the modification package and process it through the system. The modification package should include:

- (1) the cover letter to Contracting;
- (2) the modification;
- (3) the appropriate funding documents, if required;
- (4) the AF Form 3052, Construction Cost Estimate Breakdown, if required;
- (5) the revised drawings and specifications, if required.

When the modification package is completely assembled and approved, it is forwarded to the Contracting Officer for continuation of actions. After Contracting receives the complete modification package and the certified funding documents, they forward the modification to the contractor and, if required, a negotiation will be scheduled.

If the project is through prior year funding, after the modification has been negotiated, the modification will usually be awarded if the negotiated amount is less than the government estimate. This is due to actually having funds for the modification. If the negotiated amount is higher than the government estimate, another UOL must be completed to obtain the additional approval and funds.

For current year dollars, a letter must be sent to command Resources requesting the funds to award after negotiations are complete, regardless of whether the final amount is above or below the government estimate. This is due to having only authority, not actual dollars for the modification.

2.6.3.2 Contract Deviations

Often during the course of a construction contract, the contractor will request or suggest a change to the plans or specifications. Depending upon the scope and potential for equitable adjustment, there are various methods for satisfying the request.

In some instances, it may be allowed as a "field change." Allowable field changes are minor changes, due to unfore-

seen job conditions, user requests, or design oversights, clearly resulting in an equal or better product at no cost or time extension to the government. Some examples of field changes would be a change in location of a light switch or receptacle to suit the using agency or to make a room more functional. Change in material to a grade better for availability reasons or the change in grade of sewer or water line to clear utilities are minor field changes.

Changes resulting in a change in contract cost require a modification to the contract. These change orders should be limited to those circumstances that would render the facility unusable from a functional standpoint or a major mission change has rendered the original design inadequate. These changes must be coordinated by the team leader, reviewed by the Chief of Contracts Element, and approved by the Contracting Officer.

Approval of a field change resulting in a better job at no cost to the government and does not give the contractor a cost advantage must be coordinated with the team leader to ensure the change does not disrupt other design considerations. The inspector annotates the change on the plans and verifies the change is included in the submission of the final as-builts. The reason for the change and the contractor's agreement is recorded in the daily log book. A formal field change memorandum describing the change is signed by the job superintendent, project inspector, project engineer, and forwarded to the Contracting Officer for final approval.

Value Engineering Change Proposals (VECP) are contractor initiated suggestions to satisfy the requirements of the contract in a more economical manner and share in any resulting savings. Value engineering attempts to eliminate, without sacrificing essential functions or requirements, waste or inefficiency that might increase acquisition, operating or support costs. (Reference FAR Part 48 and FAR Clause 5248-1). Upon receipt, contracting, with the help of the Contracts Element, should promptly process and objectively evaluate the proposal. The inspector, with the assistance of the project engineer and the A-E if applicable, should be ready to answer the following questions:

- (1) Does the change impair essential functions or characteristics?

- (2) Does the change substantially reduce overall collateral costs, taking into account maintenance and life cycle costs?
- (3) Does the change require a formal modification to the contract?
- (4) Is the time needed to evaluate and implement the change worth the potential delay in contract progress?
- (5) Is the cost estimate provided by the contractor accurate and fair?
- (6) Will the change require any additional testing or increased services and to what degree?
- (7) Are the contractor's proposed specifications, contract documents, and performance requirements accurate?

If there is a negative answer to any of these considerations, a complete explanation of the reasons should be forwarded immediately to Contracting to ensure a prompt response within 45 days. If all questions are positive, a government cost estimate should be prepared and forwarded to the Contracting Officer.

2.6.4 *Project Close-out Procedures*

Close-out of a project should be completed no later than ten days after final acceptance. This enables the sections to close out a file which will be complete and accurate so future users will find it of value to the Air Force. These records will remain within the section for a minimum of one year after completion and then be forwarded to the document staging area on base.

2.6.4.1 Inspections

The pre-final inspection is usually performed when there are only a few items to be completed and there is time before the final completion date to allow time to complete all items.

The project inspector and the contractor will thoroughly inspect the job for all remaining items to be completed. This inspection is conducted at the contractor's request. All incomplete items of work should be entered on a standardized base developed "Report of Inspection" form. A copy of this pre-final inspection form is then provided to the contractor, Base Contracting, and filed in the project folder.

The project inspector should request that the design engineers be present at all pre-final inspections to aid in in-

specting technical aspects of the project, such as fire, electrical, and mechanical systems.

The Facility Maintenance Element review and the pre-final inspections can be combined at the project inspector's discretion.

The operations and maintenance check (O&M) will be conducted prior to the final inspection. This review provides the opportunity for the users, Fire Protection Flight, and maintenance personnel to become familiar with newly-installed equipment and/or systems. A functional demonstration training class, if required by the contract, will be conducted at this review. If obvious discrepancies are identified at this review, they shall be given in writing to the project inspector who will validate the discrepancies.

The contractor will request a final inspection when all, or nearly all, items noted on the pre-final inspection report have been completed. The inspector will formally notify and invite all appropriate base agencies to attend the final inspection. At a minimum, the inspection group should include the contract manager, team leader, using agency, contracting officer, and the contractor. An orderly tour of the project should be made. The inspector records all valid discrepancies identified during this walk-through on the inspection report form.

2.6.4.2 Closing Actions

Upon satisfactory correction of all discrepancies noted on the final inspection, the inspector formally closes out the project.

All warranty information is placed in the PCMS/PM database. Two copies of the warranty information file are printed. One copy is in a project file and the other copy attached to the front of the project folder. The construction inspector/QAE will fill in the warranty log.

The completed Real Estate Construction Data Sheet is forwarded to Real Estate (one copy) and one copy maintained in the project file. (The copy in the folder should indicate the date forwarded to Real Estate and include the inspectors initials.)

The AF Form 327, Base Civil Engineering Work Orders, is completed, ensuring the final cost and completion date is recorded on the AF Form 327. (The copy in the folder

should indicate the date forwarded to Resources and include the inspectors initials.)

As-built drawings are sent to Maintenance Engineering for updating of Record Drawings. Keys are given to Real Estate and O&M facility manuals to Facility Maintenance. Maintain a copy of all hand receipts in the project file.

Ensure all required copies of Operation and Maintenance manuals for installed equipment and systems have been received and copies sent to Facility Maintenance.

AF Form 1477, Construction Inspection Records, and AF Form 3065, Contract Progress Reports, are sent with a transmittal letter to Base Contracting. The letter stating the logs/form was received is filed in the folder.

If applicable, complete DD Form 2626, Performance Evaluation (Construction), and submit it to the Army Corps of Engineers to include in the Construction Contractor Appraisal Support System (CCASS). (See Section 2.3.11 of this AFPAM for details on CCASS).

Finally, a white tab is attached to the front of folder and the completion date is posted. The folder is then forwarded to the element chief for review and signature.

NOTE

On all construction projects involving asbestos, the following statement must be posted on the front of the project folder. "Asbestos Involved. This folder must be maintained for a period of 30 years IAW OSHA 1910 and 1916."

2.6.5 *Warranty/Guarantee
Procedures*

The Air Force spends a large portion of its budget on items covered by warranty or guarantee. When the warranty and guarantee provisions are not enforced, the Air Force wastes funds. To avoid this loss, the Base Civil Engineer establishes a program to choose items with warranties or guarantees that are practical to enforce. The BCE maintains records on these items, and identifies the items to prevent workers from voiding the warranties or guarantees.

The lead construction inspector/QAE manages the warranty and guarantee program. The inspector is responsible for making an evaluation of each warranty or guarantee. The construction inspector/QAE is also responsible for provid-

ing warranty or guarantee information to the Operations Flight for items of equipment or real property obtained or repaired by contract.

When a project involves an existing facility and equipment is to be removed or replaced, Facility Maintenance should be contacted to determine if the equipment is in the Recurring Maintenance Program (RMP) inventory. If it is in the inventory, Facility Maintenance should be advised to remove the item. Facility Maintenance needs the contract work order number, project number, and the date the equipment will be removed.

Warranty/guarantee information is entered into the PCMS/PM computer. The type of information to be included in the warranty file is size, capacity, location of equipment within the facility, serial number, if new equipment is installed with existing equipment, and any specific remarks that will help determine if an item is under warranty.

Once the information is input into the PCMS/PM computer, two copies are printed for the Warranty/Guarantee Log and the project folder.

All original warranty or guarantee documents are attached to the file copy of the PCMS/PM report and a copy of the documents is attached to the log copy of the PCMS/PM report.

2.6.5.1 Warranty Repairs

When an item is to be repaired or replaced under the warranty/guarantee, the Facility Maintenance chief will notify the inspector or team leader. Notification is done with a job order issued from the service call desk with a worksheet attached detailing the problem. This job order and worksheet is sent to the Facility Maintenance through the controllers. Facility Maintenance will thoroughly check the service call to determine, exactly, what has failed or needs repair. Once this has been done and it is determined to be a warranty item, Facility Maintenance will complete a warranty worksheet providing a detailed description of the problem, the date the problem was identified, the specific location of the item, any corrective action taken, and the shop personnel to contact when the contractor arrives on the job site. The Facility Maintenance chief signs the worksheet and forwards it to the Contracts Element for ac-

tion. All incoming warranty items are sent to the lead construction inspector/QAE for review.

Facility Maintenance is required to perform all maintenance on new equipment, even if it is under warranty. Failure to do so could void the warranty.

Under emergency conditions, the BCE, the Chief of Contracts Element, or the contracting officer can authorize Facility Maintenance personnel to repair or replace any defective items without forfeiting or voiding the warranty. This action can be taken when the health and welfare of human life is endangered or when failure to correct the problem will result in further damage to equipment or government property.

Once the construction inspector/QAE has reviewed the job order, the job order number will be posted to the warranty sheet. The job order is assigned to the inspector who was in charge of this project during construction.

If the Contracting Officer has retained authority for notifying contractors on warranty issues, the inspector will call them and request warranty work be accomplished. The contracting office will provide the contractor with the project/contract number, the warranty close-out date, the prime contractor, an itemized description of the failure (using a worksheet), the condition code (urgent, routine, safety item, etc.), and request a government representative be present when repairs are being made.

The contract administrator's name, date, and time of call is recorded. If requested, contracting notifies the Contract Element within three working days of the call (sooner, if urgent), and identifies who will repair the warranty item, and when the repair will take place. This information is reported to the construction inspector/QAE. If, after three working days, Contracting has not provided the inspector the follow-up information as requested, the construction inspector/QAE is notified. The Contracting Officer will be contacted for clarification as to the status of this work. Failure to receive a satisfactory answer will result in the Chief of Contracts Element notifying the BCE of these actions and asking for further assistance. If necessary, the construction inspector/QAE will initiate a follow-up letter for the BCE's signature.

Exercising warranties on Military Construction Projects (MCP) managed by either the Corps of Engineers or the Naval Facilities Engineering Command should be initiated through the local resident engineer office when possible. The same information as for a base managed project is provided.

Once the item under warranty has been verified as being repaired or replaced, the job order is returned to the construction inspector/QAE and the completed worksheet with a list of items repaired or replaced is dated and filed in the warranty folder under completed warranty items. The job order should be returned to Facility Maintenance indicating the actions taken. Facility Maintenance will then close out the job order.

2.7 Post-acceptance Inspections

The purpose of a post-acceptance inspection is to discover latent design or functional deficiencies not apparent before or during acceptance of facility inspection. It should be scheduled by the project inspector between nine and twelve months after physical completion of the project. The inspector should schedule a visit with the using agency and record any latent design or functional deficiencies not identified prior to acceptance of the project. A standardized post-acceptance form should be developed which describes the project data, (i.e., title, cost, the final acceptance date, post-acceptance inspection date, the inspector's name, and any deficiencies noted).

After recording items on the post-acceptance inspection, the form should be posted to the chief of the Contracts Element for signature and transmittal to the contracting officer for action. Warranty items should be addressed according to appropriate office procedures. The completed form is filed in the project folder.

2.8 Military Construction Program

The following guidance defines the BCE function and responsibilities for design and construction management related to the MILCON program. It is applicable to construction as authorized by Congress and accomplished by the design and construction agents (U.S. Army Corps of Engineers/Naval Facilities Engineering Command). The MAJCOM's Directorate of Engineering and Construction is the focal point of contact with the design/construction agents on all matters relating to the execution of the MILCON program. Responsibilities of the BCE for MILCON projects includes, but is not limited to, construc-

tion surveillance, funds management, control of change orders and change request, and expeditious transfer and acceptance of completed projects.

The primary function of the BCE is continuous owner-type surveillance of construction as outlined in AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, and applicable command supplements. The accuracy of surveillance is reflected by the quality of status reporting and active participation during the entire execution of the construction contract.

The Contracts Element acts as the representative of the BCE. As the representative, it will assign a project designer or project manager to be the base focal point for coordination with the construction agent in all matters relating to the project. This representative will participate in the pre-bid and site visits and the pre-construction conference. In coordination with the construction agent, the Element reviews the site condition and restrictions, construction phasing requirements, and demolition (For additional guidance and details see *The United States Air Force Project Manager's Guide for Design and Construction*, published by the Air Force Center for Environmental Excellence).

Some important points to understand about MILCON and P-341 projects are:

- (1) Initiation of the design process for most Military Construction (MILCON) program projects is started after the DD Form 1391 has been submitted by AF/ILEC to OSD as part of the President's Budget package.
- (2) A major command or installation cannot change a DD Form 1391 for a project once that project has been forwarded to OSD unless OSD requests a change. This is true even if the appropriated amount approved by Congress differs with the programmed amount (PA) shown on the DD Form 1391. Once submitted to Congress, the DD Form 1391 may only be changed if Congress did not authorize and appropriate the project or if AF/ILEC and SAF/MI must submit a reprogramming package for Congressional approval.
- (3) If the low bid CWE (construction contract amount, plus contingencies and SIOH) is greater than 125 percent of the programmed amount authorized and appropriated by Congress, the project must be re-

designed, rebid, and awarded the project under the 125 percent limitation or reprogrammed.

2.8.1 *Cost Control During Design*

Due to differences between programmed amounts, design cost estimates and low bids for MILCON projects, HQ USAF/ILEC decided to implement a cost control during design process. The key elements of this process are:

- (1) The BCE, A-E Firm, or design agent prepares a parametric cost estimate at the Requirements Document (RD) phase.
- (2) The RD parametric cost estimate serves as the basis for the programmed amount on the DD Form 1391.
- (3) The design agent validates project requirements and prepares an independent parametric cost estimate at the Preliminary Design (PD) phase in work breakdown structure (WBS).
- (4) Design agent compares project requirements and costs between the RD and PD phases.
- (5) The user, MAJCOM, and design agent resolve differences prior to design start.
- (6) The PD parametric cost estimate WBS allows design agent to establish design budgets by discipline.
- (7) The design agent compares quantity take-off estimates during design stages against parametric estimates and WBS budgets.
- (8) The user, MAJCOM, and design agent resolve differences prior to continuing design.

2.8.2 *MILCON Construction*

The project requirements are coordinated with the using agency prior to construction start and the AF Form 103, BCE Work Clearance Request, is generated. During construction, the inspector makes surveillance inspections at least once a week, documenting construction observations on an AF Form 1477, Construction Inspection Record. The inspector will also record a weekly progress report and any contract modifications executed and/or identified during the week.

Change order requests initiated by the using agency are managed by the Element by obtaining MAJCOM approval and funding. Contracts attends the pre-final and final inspection with all of the appropriate base representatives and follows up on punchlist items with the construction agent.

Upon close out of a project, a DD Form 1354 is provided to Real Estate office for capitalization. As part of this final

close out, important warranty data is loaded into the computer, and as-built drawings are provided to Maintenance Engineering section. At final inspection, the contractor's warranty list is obtained and the prime contractor/sub-contractors notified when requesting warranty work.

2.9 A-E Liability Program

The following guidance outlines a formal process for evaluating contract modifications to A-E designed projects in order to determine if A-E liability is involved, whether or not to pursue A-E liability, and how to pursue A-E liability.

A-E firms are responsible for the projects which they design. In most cases, a quality product is received. In instances where design deficiencies occur, the government may incur damage and added cost. FAR 52.236-23, Responsibility of the A-E Contractor, outlines the A-E responsibilities.

The A-E shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications, and other services furnished by the A-E under this contract. The A-E shall, without additional compensation, correct or revise any errors or deficiencies in its designs, drawings, specifications, and other services.

Neither the government's review, approval, or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract, and the A-E shall remain liable to the government in accordance with applicable law for all damages to the government caused by the A-E's negligent performance of any of the services furnished under this contract.

The rights and remedies of the government provided for under this contract are in addition to any other rights or remedies provided by law.

If the A-E is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.

Common deficiencies in A-E performance:

Discrepancies — Includes conflict with drawings only, conflicts with specifications only, and conflicts with specifications and drawings.

Errors — Includes incorrect dimensions, typographical errors, and mathematical errors.

Omissions — Omitting from the drawings, specifications, or both, essential information specified in the Statement of Work or given to the A-E during the design phase or items clearly necessary for a complete and viable design.

2.9.1 *Design Deficiencies*

Design deficiencies may result from a number of causes, such as inadequate statement of requirements by the government during the conceptual design stage, inadequate design criteria, insufficient field investigation, and error of omission. Not all design deficiencies result from negligent performance on the part of the A-E, nor do all deficiencies result in damages to the government. Corrections and/or revisions in designs, drawings, specifications, and other services are usually accomplished by the A-E's without question. However, collection for damages to the government resulting from a construction contract modification, attributed solely to A-E performance, is much more involved and requires careful consideration and documentation from the time that the deficiency is noted until it is corrected.

When a contract modification occurs in an A-E designed project, the modifications will be reviewed using the following process to determine whether the A-E is liable for the damages and if and how compensation is pursued.

The project designer will write the modification and, with the Liability Coordinator (LC), will determine if a design deficiency is the cause of the contract modification. If not, the LC annotates the modification as such and a copy is placed in the main A-E project folder.

If there is a design deficiency, then it must be determined if A-E liability exists. This centers around answering "yes" to all of the following questions:

- (1) Is the construction modification attributable to a design deficiency?
- (2) Does the design deficiency stem from an act or omission by the A-E?
- (3) Has the government been damaged by the design deficiency?

- (4) Does the act of omission by the A-E result from a failure to meet the standard of care reasonably associated with the profession?

The most difficult of these items is to determine the presence of professional negligence in the A-E's action or inactions. The professional standard of care to be applied is the same standard that is used in cases involving alleged malpractice of doctors, lawyers, and other professionals who sell their services for compensation. This standard essentially requires an A-E to exercise such as reasonable care, skill, and diligence as one in that profession would ordinarily exercise under similar circumstances. If no A-E liability is determined, the LC documents this and files copies as indicated above.

If A-E liability is indicated, the LC and project designer must then determine whether to recommend pursuit of A-E liability. This is a determination as to whether recovery justifies the administrative costs which will likely be incurred in pursuing recovery. A decision to pursue A-E liability should generally only be made when it is expected the dollar recovery will exceed the administrative cost involved in the recovery action. If A-E liability pursuit is not recommended, the LC documents the reasons for that decision and file copies as indicated above.

If A-E liability pursuit is recommended, all pertinent documentation is turned over to the contracting officer to pursue enforcement of A-E liability. This may include the statement of work, design criteria, DD Form 1391, technical references, minutes of predesign and design conferences, etc., along with estimates of probable cost.

To correct the design deficiency, the A-E may agree to reimburse the U.S. Treasury for an equitable settlement or the A-E may agree to compensate the construction contractor directly.

2.9.2 *Determining Monetary Damage*

The government cannot seek those costs which would have been in the contractor's original bid had the error/omission not existed. The liability of the A-E firm with respect to design deficiencies are: (1) correcting the design error or omission and (2) paying for any additional cost to the government, if any, for implementation of those corrections. The additional costs are those in excess of what they would have been had the work been designed correctly. Any

category of additional costs the government can substantiate as resulting from the firm's negligence can be included. Usually, the major portion of damages arises from the "tear-out" costs required to construct the revisions. Therefore, recovery costs generally cover tear-out costs and/or delay damages.

2.9.3 *Administrative Actions*

In all cases of contract modification, no matter what the outcome of A-E liability, a statement concerning the circumstance of the design deficiency will be provided on DD Form 2631, Performance Evaluation (Architect-Engineer). The DD Form 2631 must be distributed, filed, and used in a manner similar to qualifications data of SF Form 254s and 255s. In addition, the information on the DD Form 2631 is sent to Contracting and the U.S. Army Corps of Engineers for inclusion in ACASS (See Section 2.3.11 of this AFPAM for details on ACASS).

Chapter 3 SABER Element Role and Responsibilities

3.1 Background

The Simplified Acquisition of Base Engineering Requirements (SABER) program expedites contract execution of Base Civil Engineering requirements by reducing design work and acquisition lead times. It is particularly well-suited for reducing the BCE work order backlogs and accomplishing non-complex construction, maintenance, and repair requirements. SABER complements, rather than replaces an installation's contract program. SABER is very similar to a civil engineering requirements contract. It allows the BCE to define a general scope of work and then issue delivery orders against the contract, eliminating the hassle of competitive bid.

SABER goes well beyond a requirements contract though. Instead of one category of work, it addresses virtually the entire spectrum of CE work. At many installations either a pre-negotiated unit price book (UPB) is used to develop detailed cost estimates for work to be performed.

Because the UPB only reflects the actual cost of the tasks listed, some concession must be made to allow for the contractors profit, overhead, and cost of local conditions. Thus, the prospective contractors only bid on a SABER contract is on the advertised coefficients. Once the contract is awarded, each item of work given to the contractor is priced using the UPB cost multiplied by the coefficient.

In addition to the UPB, the base must establish some contractual boundaries of SABER. This is accomplished by setting a guaranteed minimum and maximum for the contract. The initial contract duration is usually for the period of one year, with four, one-year renewal options.

3.2 Basic Definitions

A SABER contract is a firm fixed-price, indefinite delivery/indefinite quantity contract which includes a collection of detailed task specifications encompassing most types of real property maintenance, repair, construction work, and a detailed UPB. For each of the tasks, the UPB identifies a unit of measure and a corresponding unit price. SABER contracts include options for work in years beyond the initial performance period.

Contractors submitting offers on a SABER contract propose coefficients. At least one coefficient for standard and

one for non-standard hour work. Others include those for geographically remote sites, secure areas, and other bases/agencies participating in the contract. Work tasks in the UPB represent bare, in-place costs; therefore, the coefficient roughly equates the contractor's overhead, general and administrative (G&A) expenses, profit, and local conditions. Total cost for pre-priced work performed under SABER sums unit tasks and multiplies them by the coefficient. BCE Work Orders selected by the Work Request Review Board (WRRB) as appropriate for SABER projects are provided by the SABER program manager (PM) to the operational contracting squadron as part of a requirements package. The SABER PM prepares, as part of the package, a programming estimate using the UPB, parametric estimating packages, or historic SABER per square foot costs. The project is then issued as a request for proposal (RFP) to the contractor by the Contracting Officer. The contractor reviews the work order, may attend a site visit with the government, and submits a proposal. Following discussion and negotiation of quantities, schedule, and other issues, the contracting officer issues a delivery order (DO) for the performance of the work.

A delivery order is the contractual instrument issued by the government to the contractor to order work under an existing IDIQ contract. A SABER DO is issued unilaterally (meaning that it is signed only by the Contracting Officer) after negotiations with the contractor. Each individual DO becomes, in effect, a fixed-price lump sum contract, and is administered accordingly. While contracting may issue a separate notice to proceed (NTP), the contract may state that the signed DO constitutes the contractor's NTP.

The UPB is a list of pre-priced work tasks. Depending upon the source of data used, UPBs may contain from 20,000 to 70,000 line items. Different databases have been developed by the Army Corps of Engineers and various commercial companies (including RS Means, Lee Saylor, Berger, and Marshall and Swift). The key to the quality of a UPB is the tailoring of the base data (which are priced at various locations, nationally) to reflect accurate local construction costs. Localization is the critical step in preparing the SABER contract technical documentation because it ultimately determines the accuracy of project costs. Localization of the voluminous data can be accomplished using computer programs. Like the data sources themselves,

there are government and commercial software alternatives. SABER contracts may contain provisions providing for annual updates of the UPB as one method of addressing economic changes throughout the contract's life.

The coefficient multiplies the UPB Bare Cost price. This coefficient represents the contractor's bid (including, but not limited to, such elements as overhead, profit, minimum design costs, G&A expenses, bond premiums, gross receipts tax, and local labor and material factors) for UPB items included in Dos. The number of coefficients initially proposed by the contractor is based on an installation's requirements (usually standard and non-standard hours, range or site work, or work in secured areas), and forms one of several bases for the award of a SABER contract. The coefficient also reflects the contractor's perception of the accuracy of the UPB. Based on criteria and predetermined formulas contained in economic price adjustment (EPA), provisions (if present in the contract), coefficients may be re-evaluated before the exercise of option years to determine if economic adjustments are warranted.

Non-priced Items (NPI) are real property maintenance or construction tasks not included in the SABER UPB, but within the basic intent and general scope of the contract. Since NPI's are not pre-negotiated, any NPI reduces the efficiency and economic value of the SABER contract. As a result, AFFARS Appendix DD places strict limits on the percentage of NPI's allowed in any single DO.

3.3 Advantages

The primary advantages a SABER contract offers over standard minor construction are:

Improved customer service and responsiveness. After the initial contract is awarded, Dos for individual projects can usually be estimated, proposed, negotiated, and issued in three to four weeks. This represents a dramatic reduction from the months required to solicit and award individual construction contracts. In addition, changes to requirements can usually be incorporated in a more responsive manner.

Enhanced ability to accomplish backlogged work orders and commander-generated requirements. SABER can also be used to accommodate "hot" projects that usually require resources over and above in-house capabilities or

otherwise interrupt the in-service work plan (IWP). Appropriate SABER projects should be determined based on the past performance of a SABER program and the individual contractor. If a SABER program or contractor is consistently completing projects at a lower square foot cost than a competitively bid project, then the base should reasonably send the program more projects. On the other hand, if the SABER program is costly or a poor performer, then more projects should use alternate contracting methods.

Potential for greatly improved working relationships and synergy between BCE, contracting, and the contractor. SABER is most effective when a coordinated team approach is applied, communication channels are open and frequently used, and all parties are committed to making the program a success.

Strong incentive for the contractor to produce high quality work in a timely manner. The contract guarantees a minimum dollar value of work the contractor will receive. Additional guaranteed work should not be included in the option years. The SABER contractor may be awarded additional Dos, above the guaranteed minimum, by performing the quality and timeliness standards expressed by the SABER contract requirements.

Addition of resources to the BCE. SABER provides a capability to perform work that is unaffected by deployments, training, inspections, and other activities that affect the shop workforce.

Added fiscal flexibility. Associate units can, and are usually willing to, fund their own projects in order to have quality work performed in a responsive, timely fashion.

3.4 Scope and Limitations

The SABER program has great potential, but it also has its limitations. As stated, SABER is designed to complement the traditional construction program. It cannot replace it. It is best suited to reduce BCE work order and contract backlogs and accomplish non-complex construction, maintenance, and repair requirements that meet certain criteria.

SABER cannot replace good planning, project design, management, and contract administration. The program is not designed to circumvent other contracting methods

which may be more appropriate. SABER should also not be used to exceed established project programming/approval limitations.

Using SABER for projects such as large asphalt, painting, or other predominately single skill/material jobs can cost significantly more than a competitively bid contract. One reason is that it is virtually impossible to quantify all of the elements that would be required to build economy of scale factors for each line item in the unit price book.

Due to statutory requirements, SABER cannot be used to perform non-personal service subject to the provisions of the Service Contract Act. An example is a delivery order predominately to install carpet, when the labor involved exceeds \$2,500. The Department of Labor has jurisdiction over whether a particular requirement is classified as construction work subject to the Davis Bacon Act or services to which the Service Contract Act applies. Their guidance provides that services such as carpet installation, landscaping, asbestos removal, and building demolition may be performed as construction when the work is incidental to a larger construction project. If the preponderance of the work involves the services cited, although there may be some incidental related construction work, the project falls under the Services Contract Act and cannot be performed by SABER.

The recommended minimum/maximum values for delivery orders (DO) is \$2,000 - \$500,000. For projects with values outside that range, the DO concept using a pre-priced UPB may result in excessive project costs. Other contract programs, or in-house work orders, may be more appropriate.

Larger projects are more likely to go beyond the advertised intent of the program. Projects may exceed \$500,000 if fully warranted by economic and/or mission requirements and if approved by the installation commander. This approval authority cannot be delegated. Specific documentation, which must be included in both the project and contract files prior to issuing a DO exceeding \$500,000, include

- (1) A cost comparison analysis between traditional construction contracting methods and SABER, to be prepared and certified by the BCE and coordinated with the contracting officer.

- (2) A SABER justification letter outlining mission and cost considerations that warrant placement of the DO, to be prepared and signed by the BCE.
- (3) Written approval to issue the DO, to be signed by the installation commander.

Minimum and maximum DO limitations must be specified in the contract using the appropriate delivery order limitations and indefinite delivery contract clauses specified in Federal Acquisition Regulation (FAR) part 16.505.

- (1) The solicitation and resulting contract identify contract limitations, guaranteed contract minimums, and maximum limitations. The range established by the guaranteed minimum and maximum amounts is intended to provide potential contractors with the government's expected scope of the total contract. The guaranteed minimum is a firm obligation and acts as an incentive to promote interest in the requirement. Unrealistically low or high minimums may respectively limit a contractor's interest or require a larger initial obligation of government funds. The guaranteed minimum should be tailored to meet the requirements of each installation based on historical data, anticipated funds availability, and other factors which may be known to BCE and contracting.

The contract maximum establishes a ceiling on the total amount of orders that can be issued under the contract. The maximum should be set at an amount that reasonably can be required over the life of the contract (base year plus options) with full consideration given to the impact of such unusual circumstances as major natural disasters.

3.5 SABER Execution Procedures

The management procedures required in the execution of individual delivery orders issued under a SABER contract are outlined below. The contract administration process is shown in Figure 3, SABER Contract Administration Process, provided on pages 73-89.

3.5.1 Project Assignment

All CE work orders are initially processed through the WRRB to determine accomplishment by either in-house personnel or contract. Once a project has been referred to the Engineering Flight for contract completion, the Engineering Flight chief may determine if the project goes competitive bid, IDIQ, or SABER. When a project is selected for SABER accomplishment, Base Development as-

signs a project number and does the initial input into PCMS/PM (See Figure 3).

Projects not in the current design schedule will be filed for accomplishment at a later date. Projects in the current design schedule, or inserted into the schedule, are reviewed for compliance with AFFAR Supplement, Appendix DD, by the Engineering Flight Chief. If it is appropriate for SABER, the SABER Chief will ensure PCMS/PM is updated with the correct design status and that the AF Form 614, Change Out Record, is filed appropriately. The project manager will also ensure that all approving documents; i.e., AF Form 332 or DD Form 1391, FY Military Construction Project Data, have been signed and inserted in the project folder.

3.5.2 *Preliminary Design*

The project manager becomes familiar with the work request through a site visit with the requestor. The project manager will develop a proposed statement of work and a Programming or Budgetary estimate. All project requirements must be in compliance with AFI 32-1024, *Standard Facilities Requirements*, and AFH 32-1084, *Facility Requirements*. If work requirements on the AF Form 332 are revised after discussions with the requester, it is modified and must be re-approved by the approving authority. This is also true if the SABER estimate exceeds the approved amount on the AF Form 332 by 25%. This is coordinated through Base Development. Preliminary design and should include any sketches or as-built drawings as required for the contractor to develop cost proposal.

3.5.3 *Funding*

SABER projects are funded by many organizations in different ways. Funding methods, in most cases, should be determined prior to execution via SABER. The most common methods of funding follow.

User Funded. Whether the user arranges to transfer the money through Resources, themselves, or have the project manager process the appropriate funding documents, the project manager will originate the documents and have Resources assign a purchase request (PR) number for tracking purposes. This process will be used for all appropriate funding documents with the exception of NAF projects. They assign their own PR numbers and process the documents to Contracting.

CE Funded. The SABER chief gets approval from the BCE or Deputy BCE for the project amount before the project manager completes the appropriate funding documents. This is usually O&M funding or from the BCE's urgent funds.

MAJCOM Funded. When local or user funding is not available, the project is placed on the approved Facilities Board Project Priority Listing for all programs. The project manager will prepare the preliminary design and cost estimate to be forwarded to Contracting. Upon completion of the contract package, the project manager will update PCMS/PM to reflect design completion date along with ready for contracting status and the RTA date to obtain contracting authority. When the message from the MAJCOM is received granting advance contracting authority, the project manager prepares the appropriate funding documents for the amount of the authority message and sends the appropriate funding documents and a copy of the AF Form 332 to Resources. Resources will process the documents and forward it to Base Finance. While the funding documents are being processed, the project manager will send the completed contract package to Base Contracting.

3.5.4 *Contract Package*

When funding is confirmed on the appropriate funding documents, the project manager sends a SABER contract package to contracting. Included in each package are:

- (1) a proposed statement of work;
- (2) a government cost estimate, if required by base contracting;

Note

The cost estimate can be either preliminary, such as Means, or the detailed UPB estimate depending on the design required from the contractor. A detailed UPB estimate could not be expected if the contractor must complete a design as part of the proposed statement of work. The cost estimate must be less than or equal to the AF Form 9.

- (3) an AF Form 66, Schedule of Material Submittals;
- (4) the appropriate funding documents;

Note

Attach a copy of the advance contracting authority message if the project is MAJCOM funded.

- (5) any applicable drawings, sketches, or as-builts of the facility; and
- (6) the installation communications waiver packages, along with an independent cost estimate (if project exceeds the 300K SABER maximum limitation for each delivery order).

3.5.5 *Project Design*

When the contract package and funding documents arrive at Base Contracting, the contract administrator sends a letter to the contractor requesting a site visit to be scheduled within three working days and the submittal of a cost proposal for the project. The contractor is responsible for preparing a detailed cost proposal and necessary drawings to properly evaluate the proposal. If the proposed statement of work is modified at the site visit, the contractor will submit a revised statement of work for review along with his cost proposal. The contractor and CE project manager are free to discuss the details of the project, excluding cost and performance time, during this phase.

Projects simple in scope should have the UPB estimate (or equivalent, if required) completed by the project manager prior to submitting the contract package to Base Contracting. When the contract package is ready for contracting, the CE project manager will prepare a package and include a signature sign-off sheet. Upon completion of review and approval, any changes required should be forwarded to Base Contracting along with a revised statement of work.

During the design phase, and through the entire life of the project, the project manager is responsible for database updates in accordance with the PCMS/PM Handbook.

All designs must be in compliance with AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, including applicable building codes, life safety codes, and ADA/UFAS requirements. When modifications are made to existing facilities that affect the structure, electrical and mechanical systems, or the circulation within the facility, the BCE must determine if the contract documents need to be approved and signed by a registered architect or engineer. The registered individual may

be either provided by the SABER contractor or the BCE organization.

3.5.6 *Technical Review*

The proposal submitted by the contractor includes a cost proposal (hard copy and computer disk), any revised statement of work, and a performance period. Base contracting forwards a copy to the CE project manager for review. The contractor's electronic cost proposals should merge all architectural, mechanical, and electrical work. The CE project manager compares the contractor's proposal with the government estimate for scope, completeness, method of construction, and pricing data by running a validation and comparison through the SABER Program software. If there are variances, a report will be printed. The project manager will highlight questionable items for negotiation and return the proposal, along with a computer comparison, to base contracting. The project manager may contact the contractor to clarify only where an item is going or what it is for. Details of the items may not be discussed with the contractor.

3.5.7 *Negotiations*

After receiving the technical review, base contracting arranges and conducts negotiations with the contractor's project manager and the CE project manager. When all have agreed on quantities, line items, prices, scope of work, and performance time, the contract administrator can issue the delivery order and "Notice to Proceed."

3.5.8 *Construction Management*

The CE project manager is responsible for coordinating construction with the user(s), inspecting all aspects of project construction, and maintaining project documentation. The project manager is also responsible for weekly updating of projects in PCMS/PM for status and completion percentage in accordance with the PCMS/PM Handbook. Any projects requiring brief explanations should be addressed on the MAJCOM/Construction screen under Base Remarks.

3.5.9 *Documentation*

The forms, explained below, are used as documentation and maintained by the project manager.

AF Form 103, BCE Work Clearance Permit: This form is coordinated by the contractor's project manager for construction involving excavation, utility disturbance, and disruption to traffic flow. A copy is given to the CE project

manager and is filed in the project folder. The contractor will keep a copy and have it accessible at the job site.

AF Form 3000, Material Approval Submittal: This form accompanies material submittals by the contractor. The CE project manager approves or disapproves the submittal and returns it to Base Contracting for final approval or disapproval. Once Base Contracting has given final approval or disapproval to the submittal, a copy is forwarded to the CE project manager to file in the project folder. Project managers track all submittals on the AF Form 66, Schedule of Material Submittals.

AF Form 3064, Contract Progress Schedule: The contractor shall submit an AF Form 3064, Contract Progress Schedule, through Base Contracting for jobs with performance times of 60 days or more. The project manager approves or disapproves the schedule and returns it to Base Contracting. Contracting signs and returns a copy for the project folder.

AF Form 3065, Contract Progress Report: An AF Form 3065 is submitted every week to the CE project manager for jobs with performance times of 60 days or more. The CE project manager will either approve the construction complete percentage or correct it and update the percentages in PCMS/PM on a weekly basis.

AF Form 1477, Construction Inspection Record: The Construction Inspection Record is kept on projects over \$25,000. Daily entries are made reporting progress of the job, problems, and agreements made. These records must be maintained daily and be as accurate as possible.

3.5.10 Modifications

A modification is a formal change to a delivery order after it has been issued. (See Section 2.6.3.1 of this AFPAM for additional details on contract modifications).

3.5.11 Negotiating Modifications

When a modification is received from CE (containing a statement of work for the modification; the cost estimate for the modification; the difference between the submittals, and; the difference in performance time allowed the contractor), Contracting will send a letter to the contractor requesting a proposal to accomplish the modification. No official site visit is necessary. When the contractor submits their proposal, the CE project manager reviews it and high-

lights any items requiring negotiation, runs a validation and comparison through the SABER Program software, and returns the marked-up contractor's proposal. A copy of the comparison is sent to Contracting.

The contract administrator arranges a negotiation meeting, if necessary. When agreement on price and difference is reached and funding is received, Contracting will execute a modification to the contract. If only authority had been obtained, Command must be notified of the negotiated amount to receive funding and then award of the modification. The flow of obtaining funds for a modification is shown in Figure 3. When the CE project manager receives the delivery order to the contract for the modification, PCMS/PM is updated to show the modification number, cost, and new contract completion date.

3.5.12 Final Inspection

The contractor will request a final inspection with the CE project manager and the contract administrator providing at least three working days advance notice. The CE project manager will notify all the individuals of the final inspection checklist (located in section F of the project folder). The checklist should show the inspection is the responsibility of the CE project manager.

During the final inspection, all work accomplished under the delivery order is reviewed. The final inspection is documented on standard Report of Inspection form. Punchlist items and the deadline to correct them is noted. A copy of the report is provided to both Contracting and the contractor. After all the punchlist items have been corrected, the project manager notes this on the form and sends a copy to Base Contracting.

3.5.13 Project Close-Out

The following is a list of the items completed by the CE project manager when the project is completed.

Warranty information is input into the WIMS/ACES. One hard copy is made for the Warranty Book and one copy is filed in the project folder.

The final project cost is noted on the AF Form 327, Base Civil Engineer Work Order, and the job coordinator signs the form. The original copy is dated and forwarded to Resources. A copy of the AF Form 327 is then filed in the project folder.

The CE project manager completes the construction data sheet. One copy is given to Real Estate and one copy filed in the project folder.

The completion date is posted on the folder and a note is made if asbestos was removed. Asbestos-related documents must be kept for 30 years. The project manager provides the environmental flight with documents indicating the extent of any asbestos removal.

A set of as-builts and digital CADD file (compliant with the Tri-Service CADD/GIS format) is obtained to use for new construction or major renovations of existing facilities. Red line as-builts are acceptable for SABER projects if design work is not required. The project manager is responsible for obtaining the signature from the Chief of Maintenance Engineering on a two-way memo showing receipt of as-builts.

Appropriate shops are given copies of O&M manuals. They also sign a two-way memo showing receipt of manuals.

The user/requester is given the Customer Service Comment Form Section F of the project folder at the time of final inspection.

The project manager reviews PCMS/PM and fills in the project's completed status, the date completed, beneficial occupancy, if any, and warranty date.

The CE project manager gives the folder to the SABER chief. The chief:

- (1) checks the folder contents;
- (2) closes out the project in the computer and the work order in WIMS/ACES;
- (3) notes completion date in the master filing folder;
- (4) completes a post acceptance inspection form;
- (5) removes the AF Form 614, Charge Out Record, from the central filing cabinet and places it in front of Section B in the project folder;
- (6) removes the SABER tracking checklist and places it in files; and
- (7) files the project folder in the SABER completed projects filing cabinet.

Figure 3.1. SABER Contract Administration Process

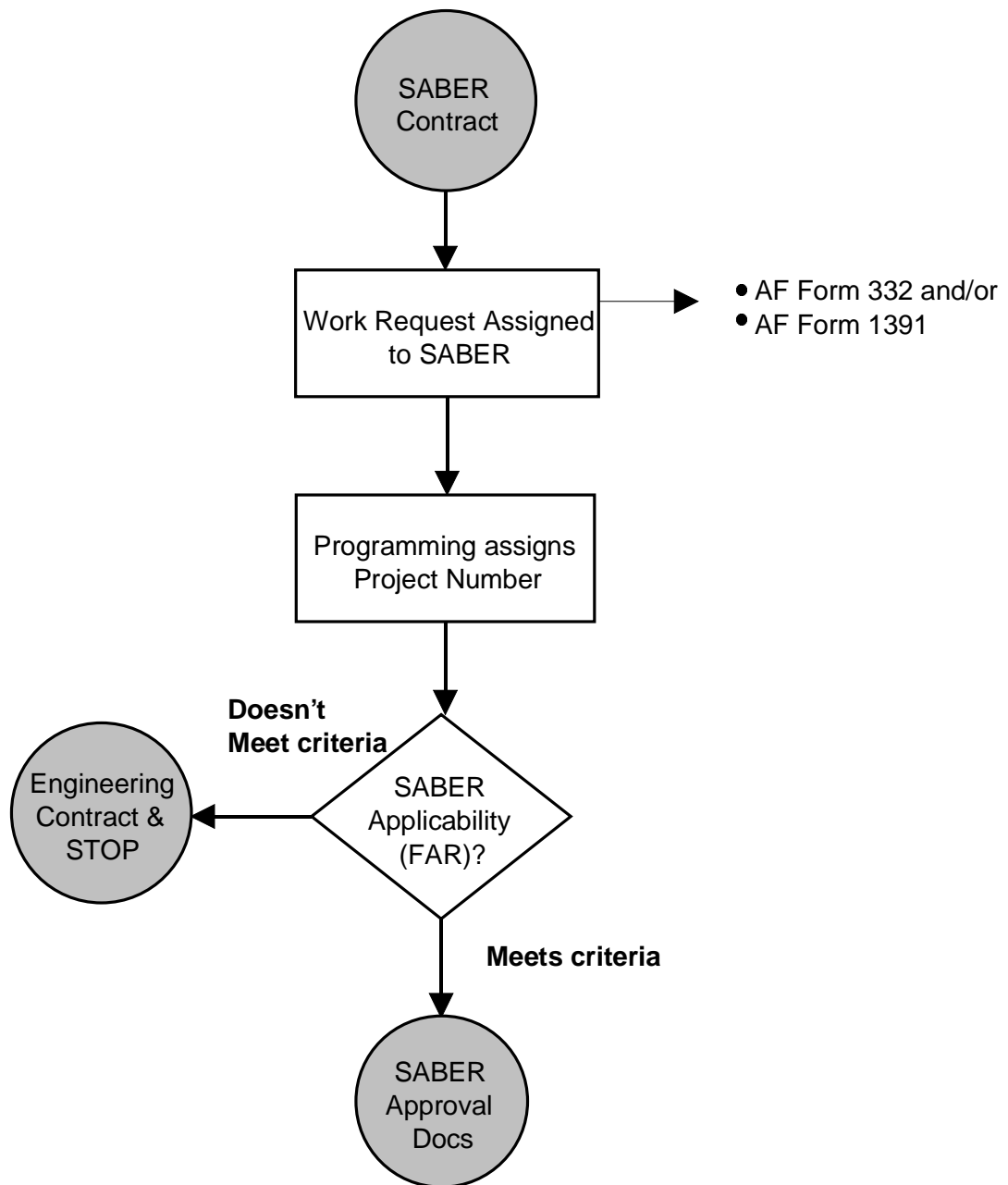


Figure 3.2. SABER Contract Administration Process, Part 2.

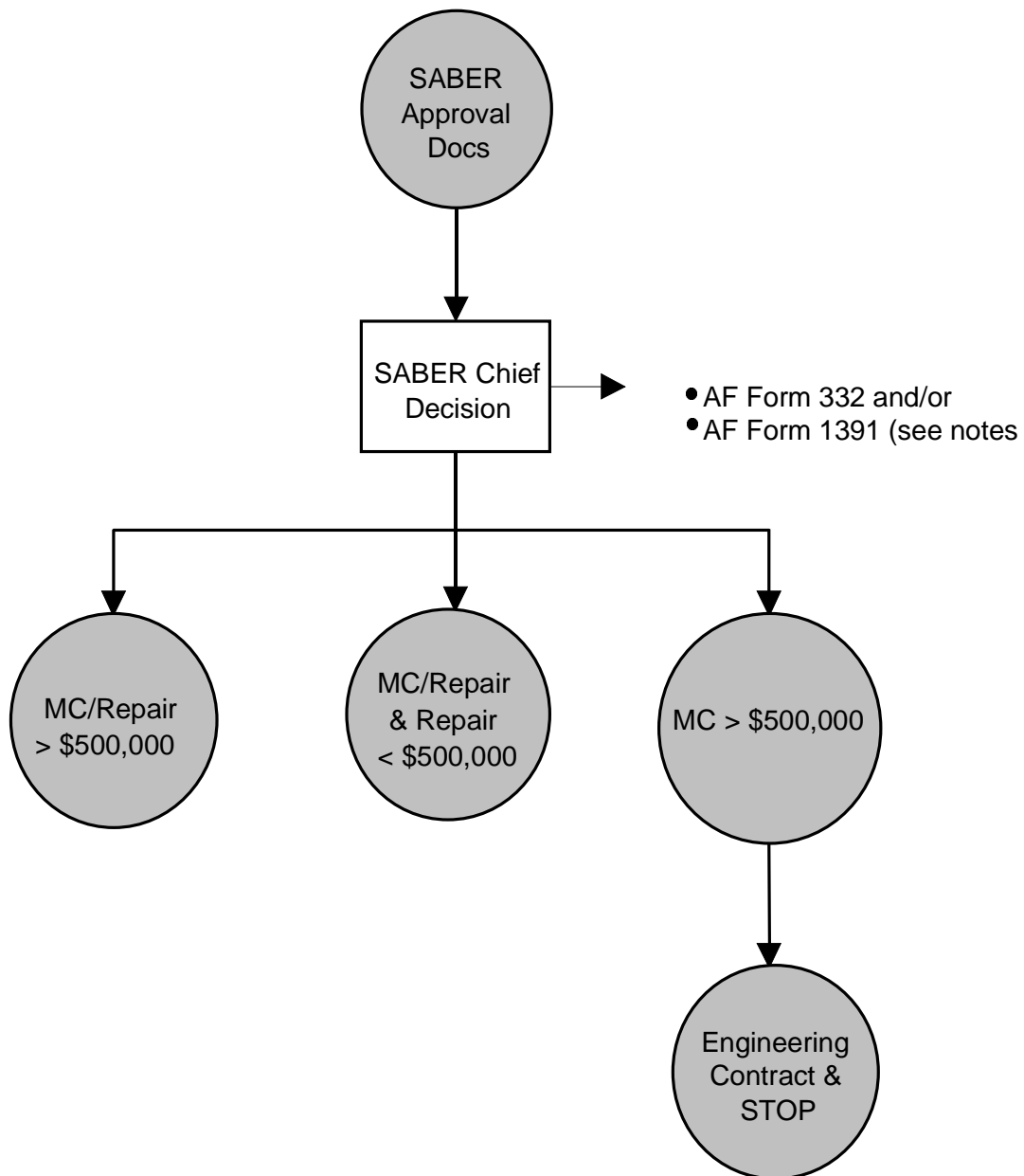


Figure 3.3. SABER Contract Administration Process, Part 3.

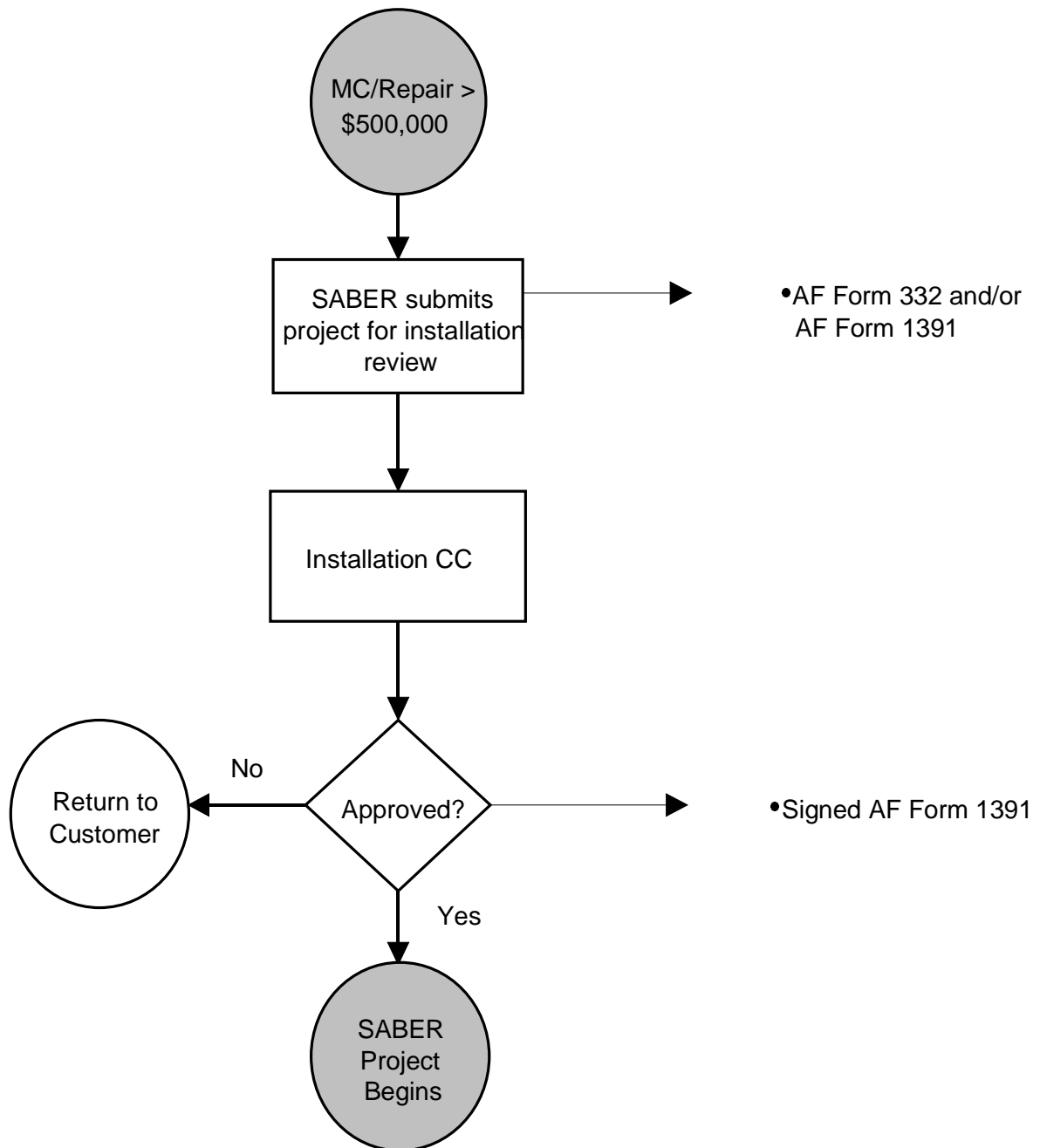


Figure 3.4. SABER Contract Administration Process, Part 4.

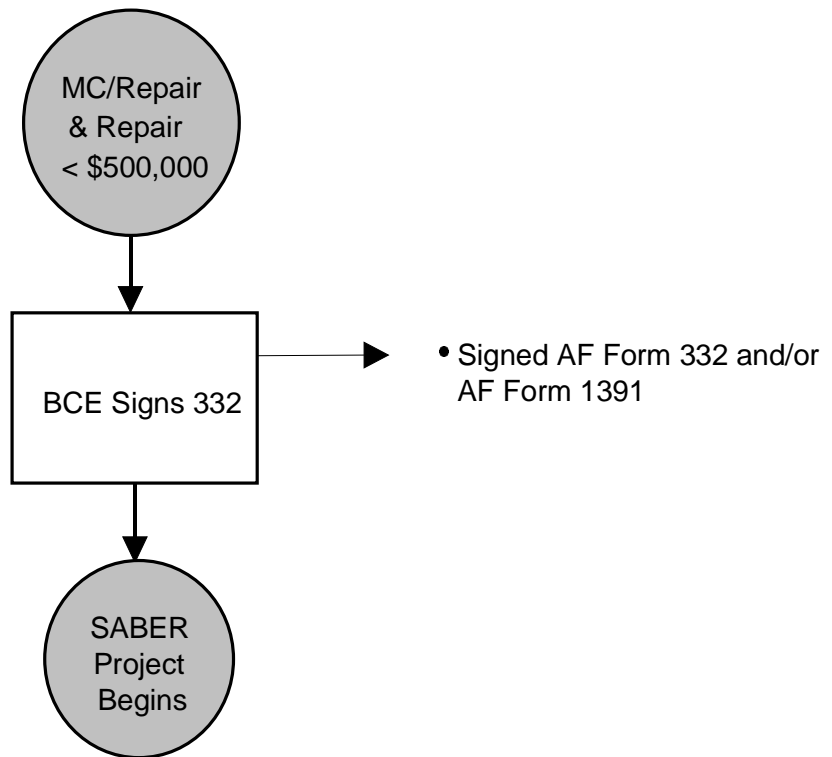


Figure 3.5. SABER Contract Administration Process, Part 5.

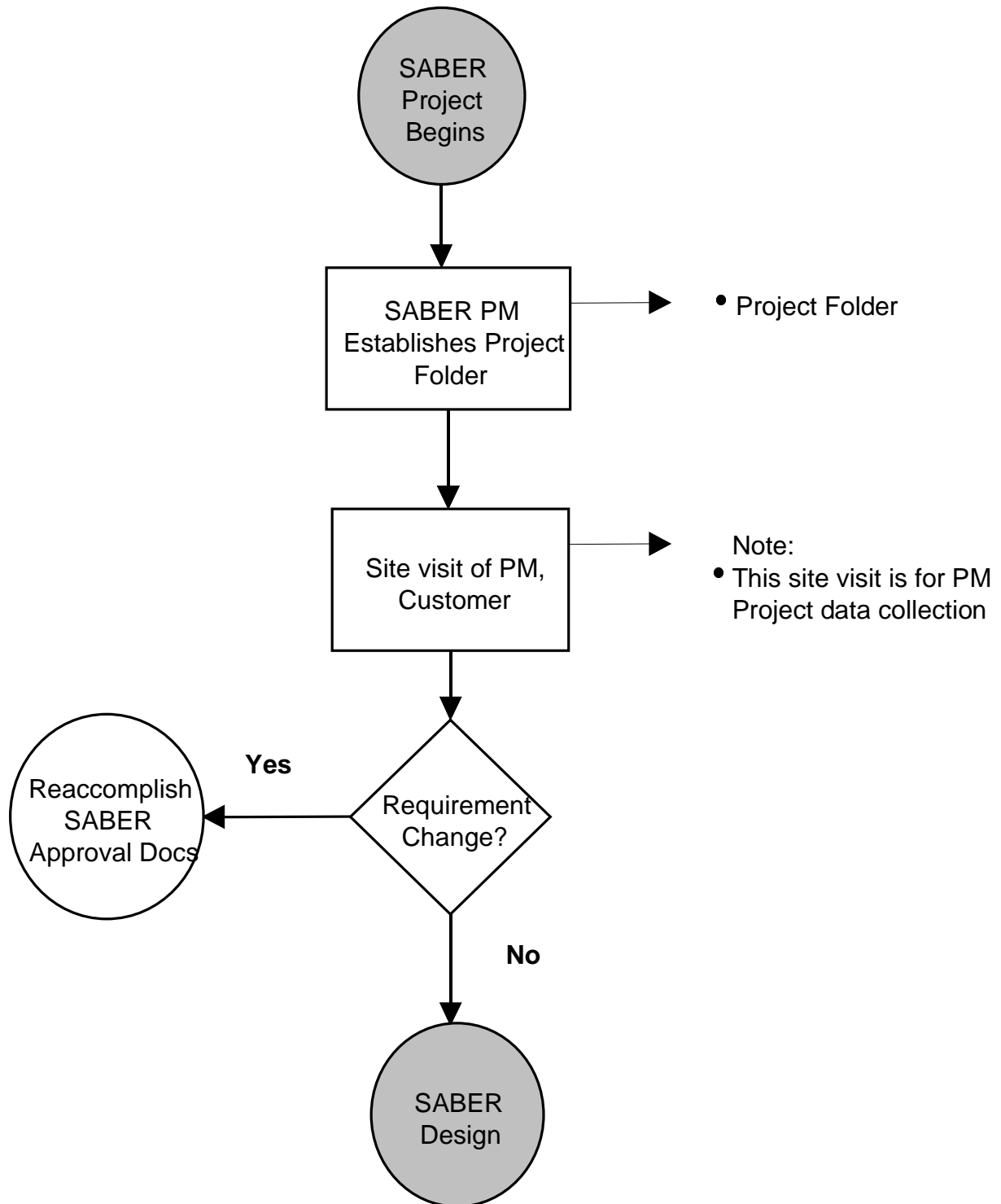


Figure 3.6. SABER Contract Administration Process, Part 6.

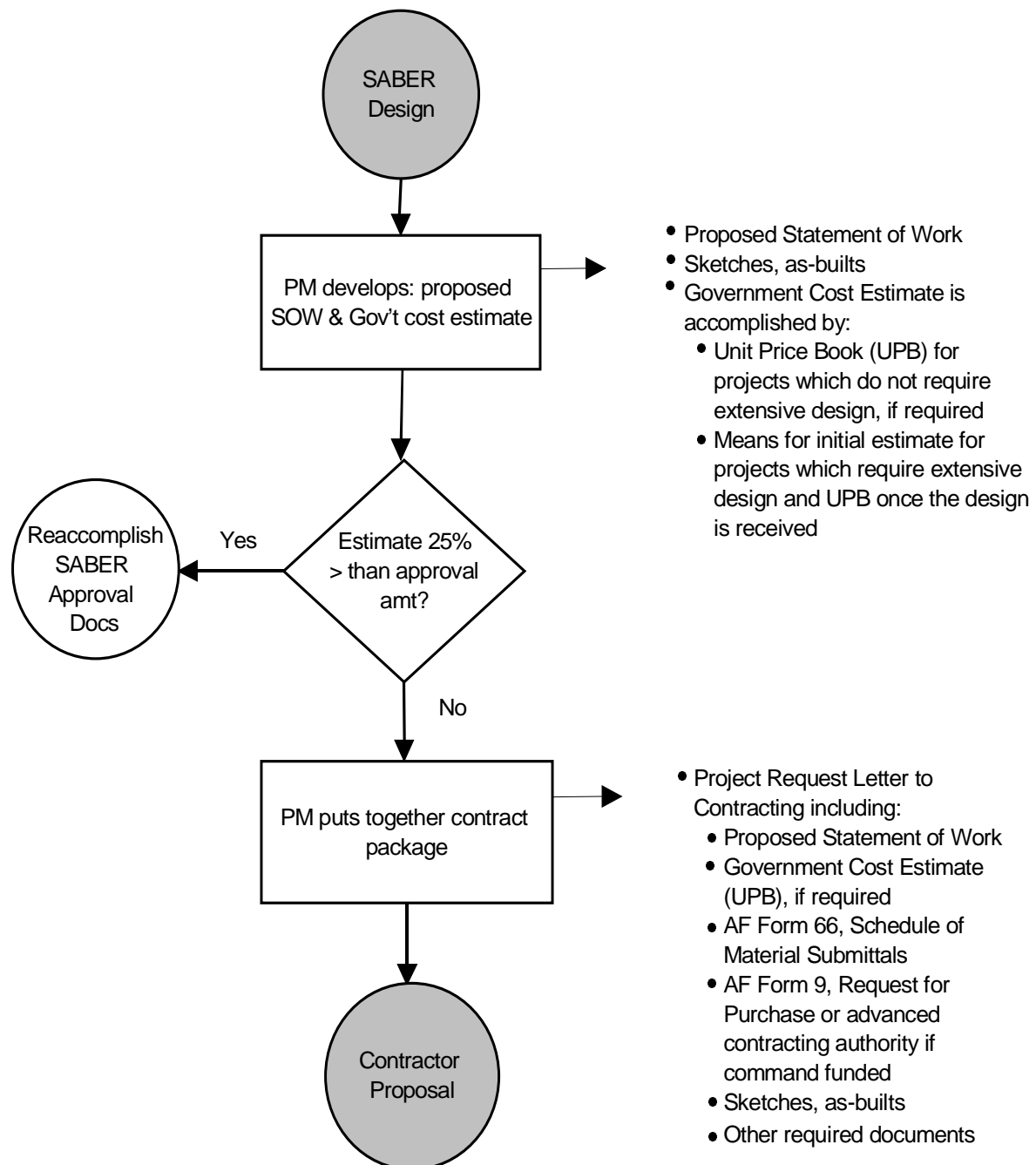


Figure 3.7. SABER Contract Administration Process, Part 7.

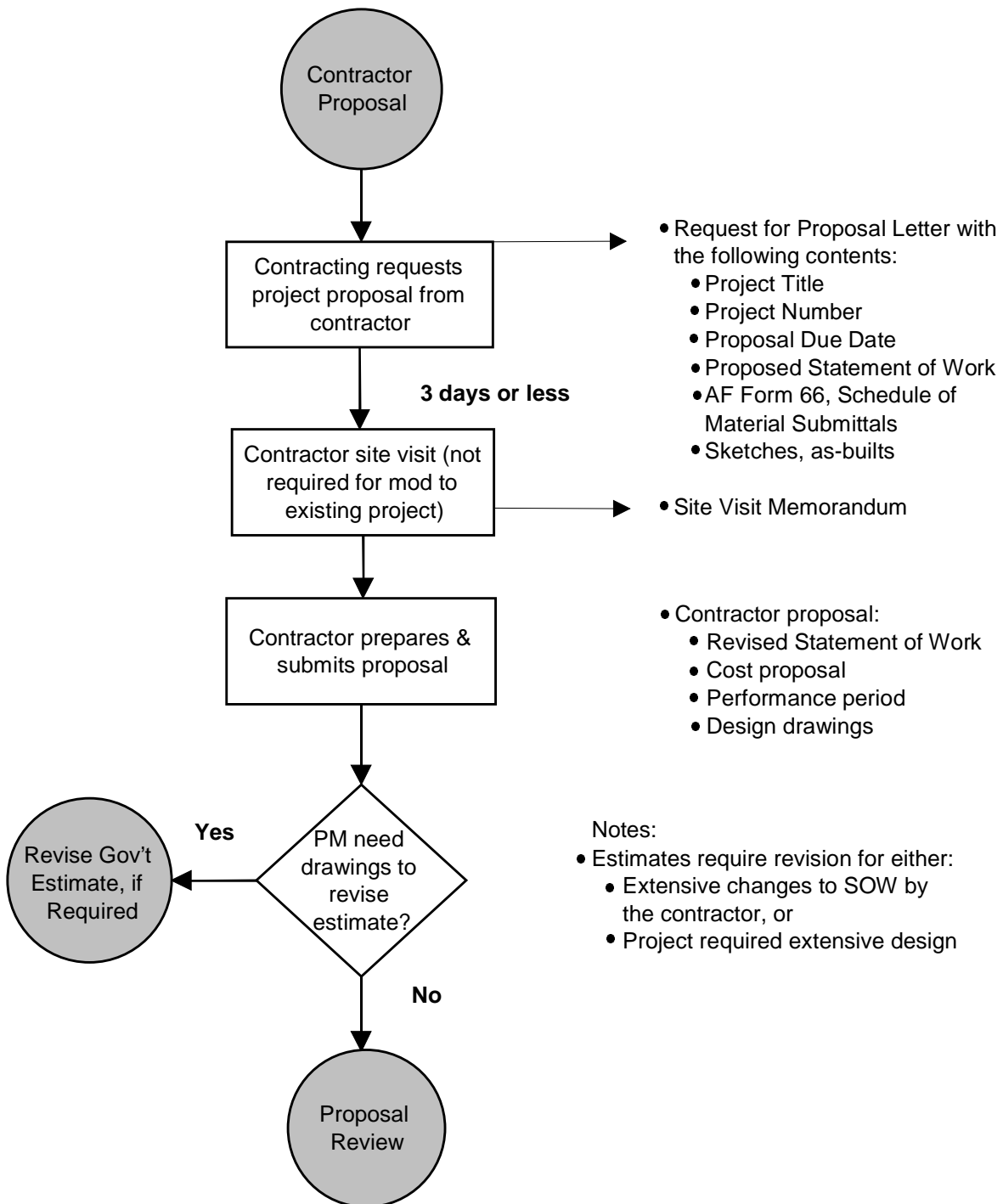


Figure 3.8. SABER Contract Administration Process, Part 8.

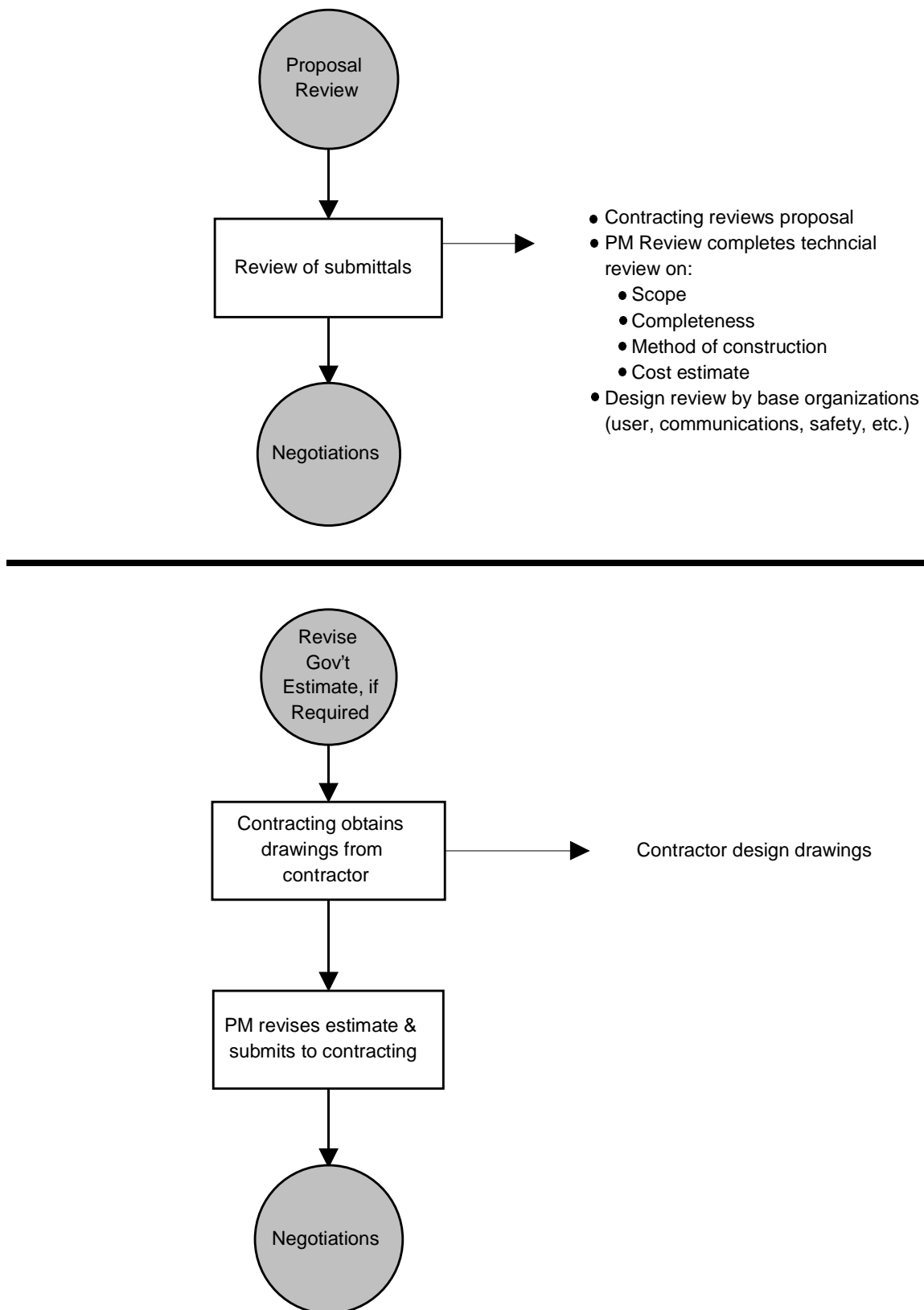


Figure 3.9. SABER Contract Administration Process, Part 9.

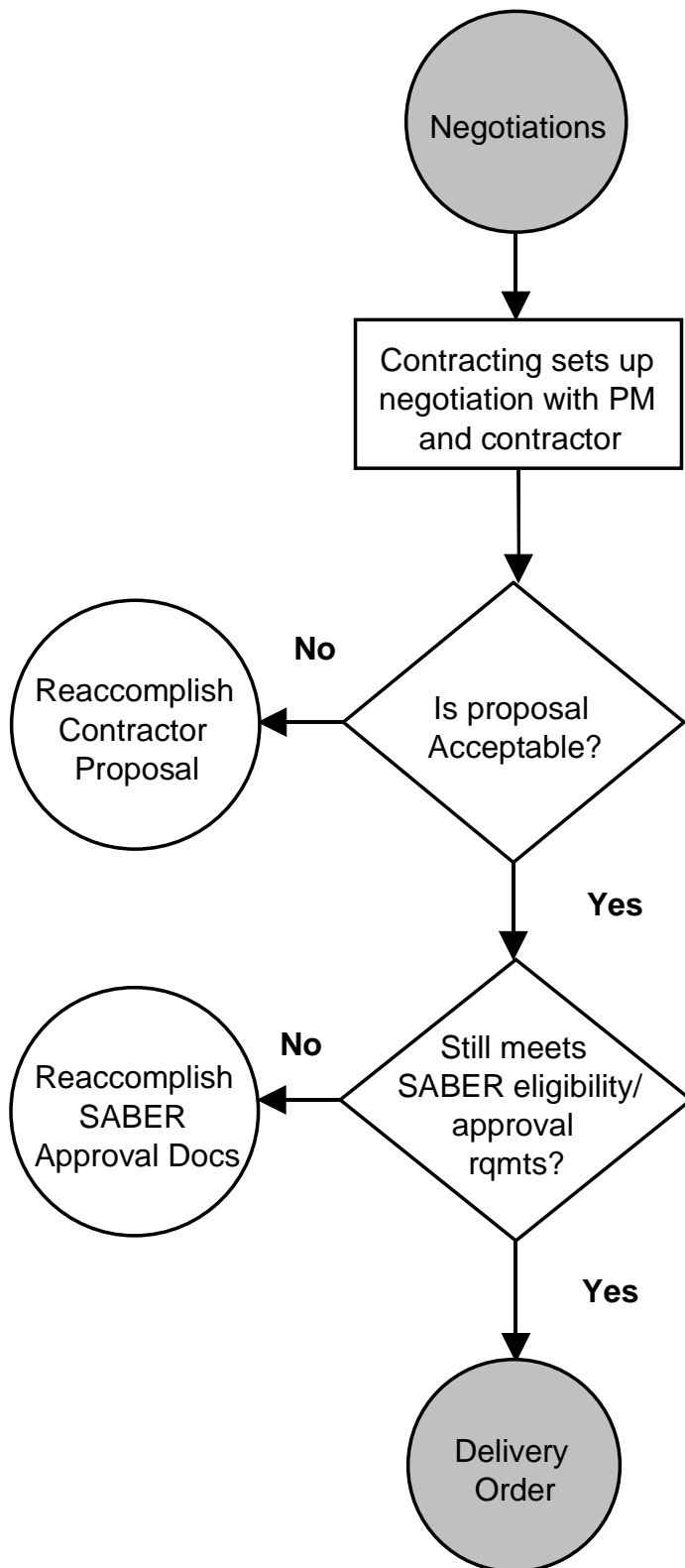


Figure 3.10. SABER Contract Administration Process, Part 10.

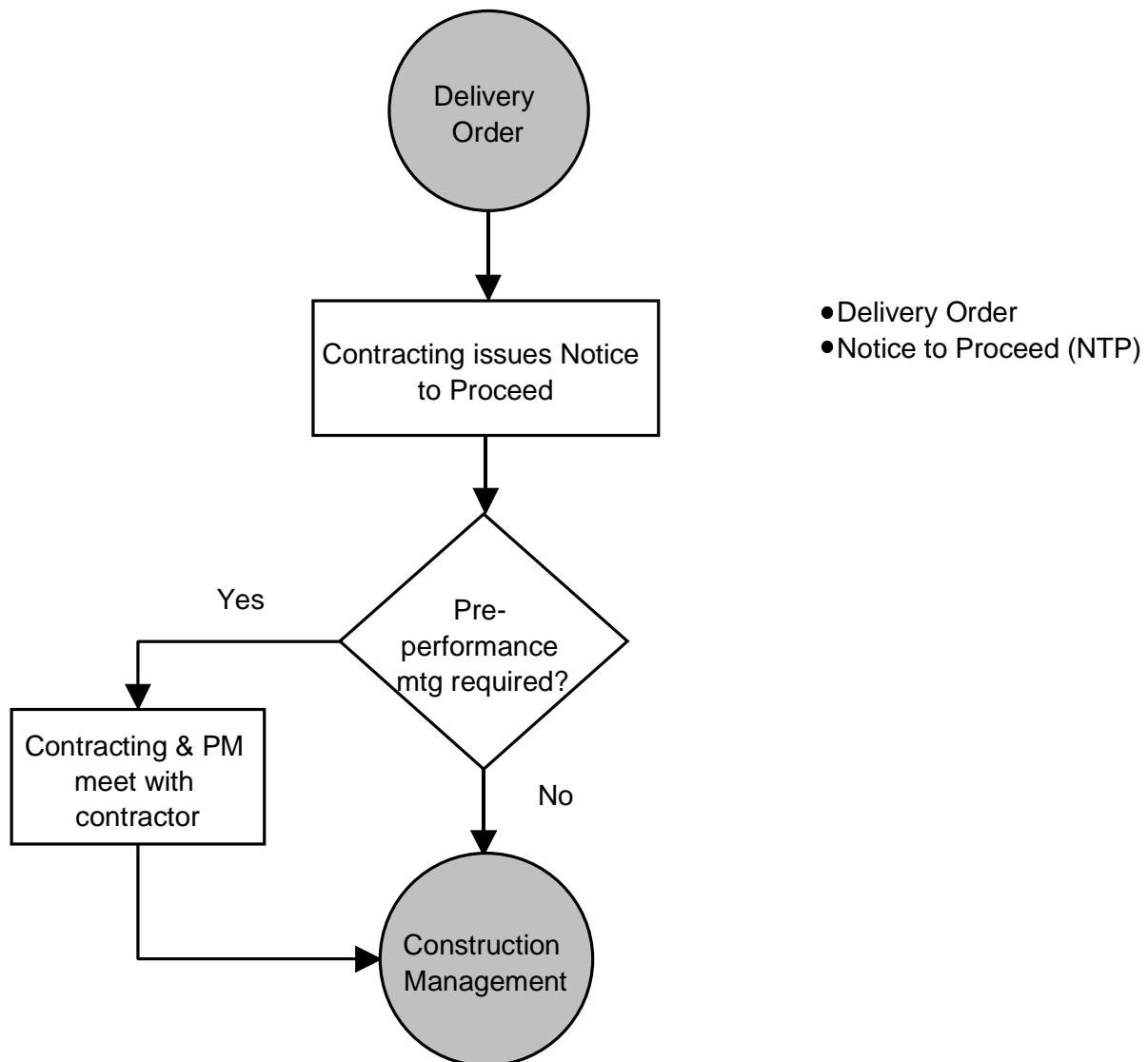


Figure 3.11. SABER Contract Administration Process, Part 11.

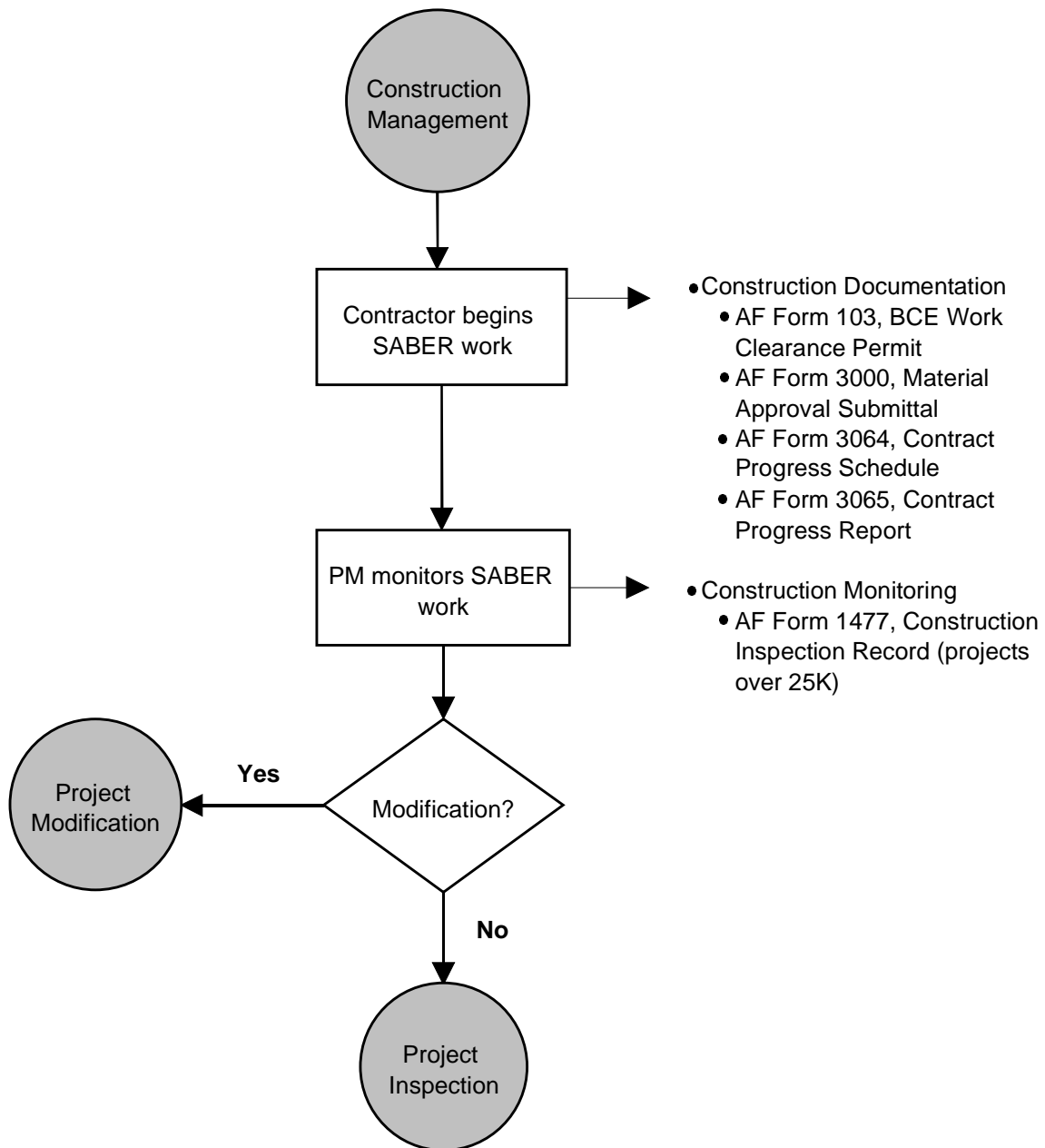


Figure 3.12. SABER Contract Administration Process, Part 12.

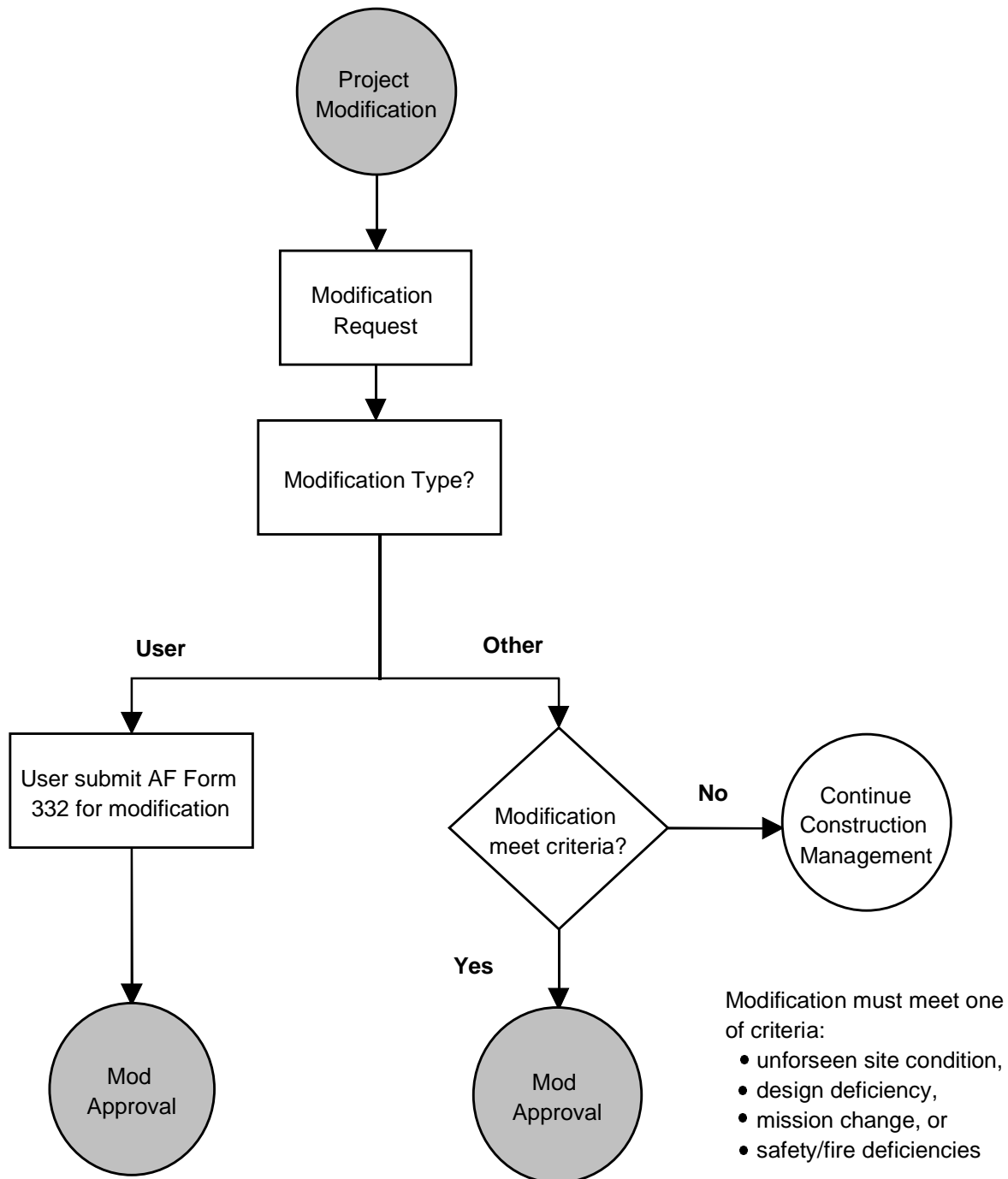


Figure 3.13. SABER Contract Administration Process, Part 13.

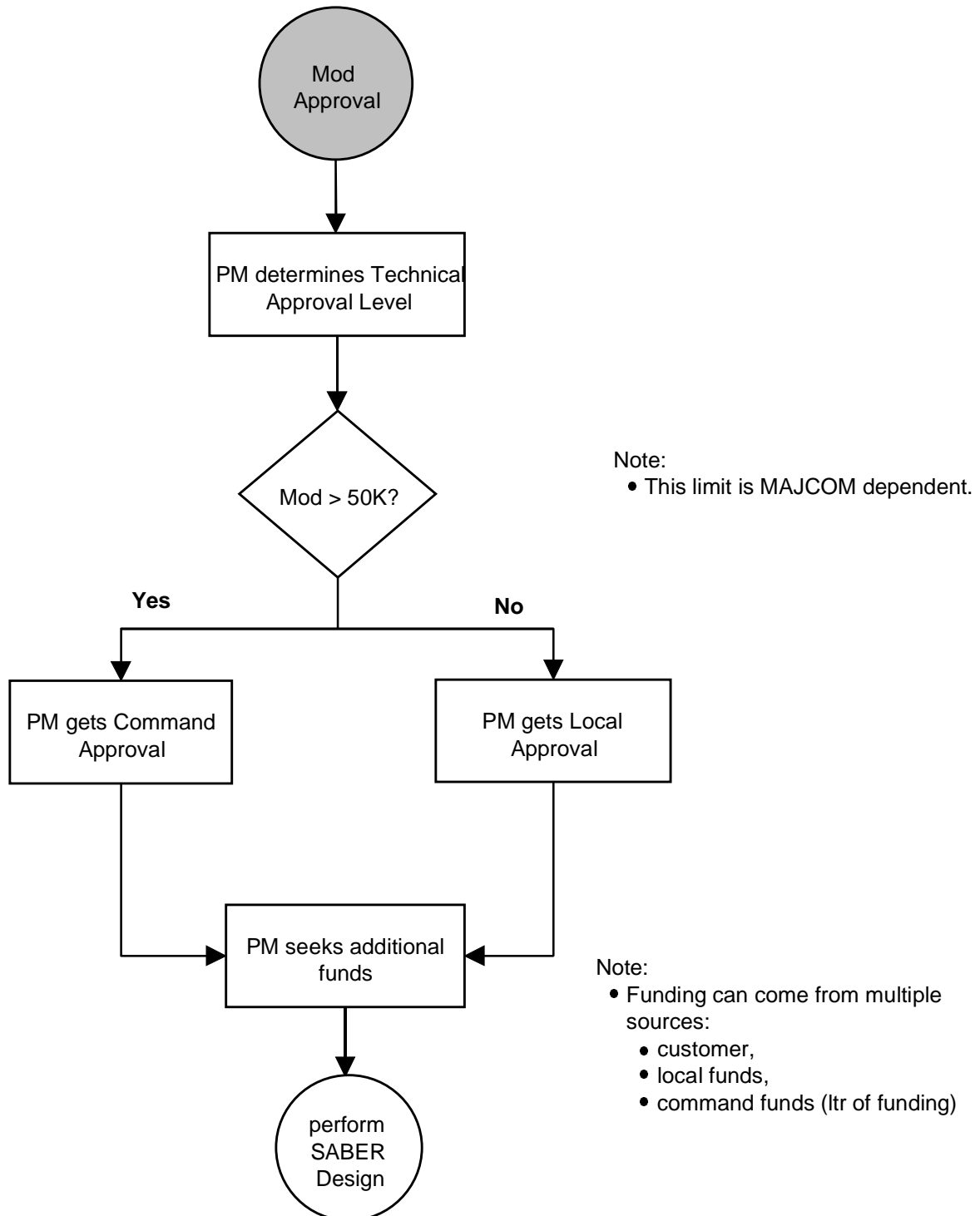


Figure 3.14. SABER Contract Administration Process, Part 14.

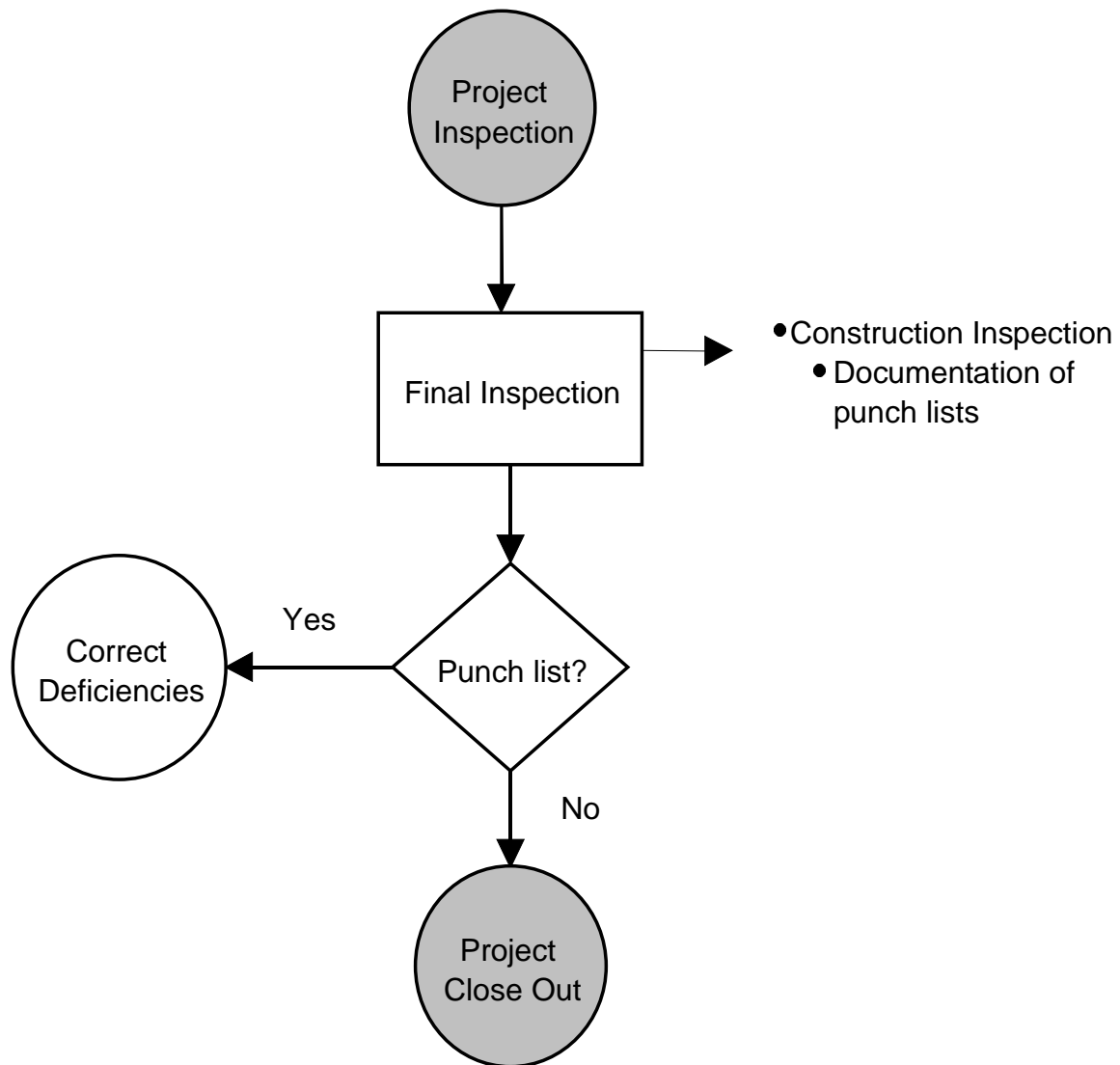
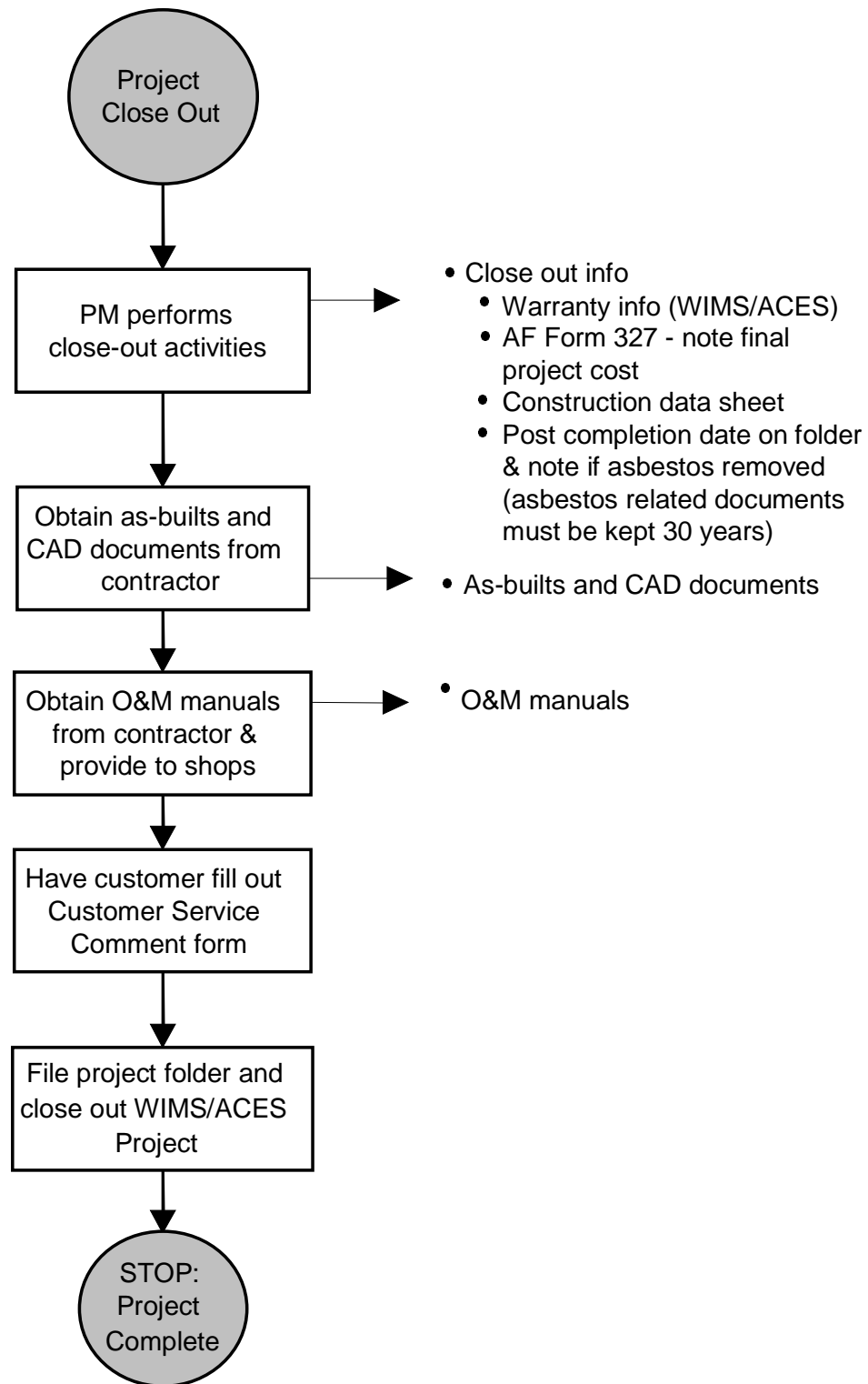


Figure 3.15. SABER Contract Administration Process, Part 15.



Chapter 4 Base Development Element Responsibilities

4.1 Overview

The Base Development Element of the Engineering Flight is responsible for the planning, programming, and execution of cost-effective, real property maintenance, repair, minor construction, and new facility construction requirements necessary to properly support assigned missions and preserve Air Force real property. The Element also manages all tasks associated with the community planning function, such as traffic management, the installation general plan, inter-government coordination, archeological requirements, airfield waivers, and air installation compatible use zones (AICUZ).

4.2 Planning and Programming Real Property Projects

Planning is the identification of facility work to satisfy current and future mission requirements. A variety of methods are used to identify facility requirements, including, but not limited to space utilization surveys, condition assessment surveys, facility investment metrics, environmental assessments, energy conservation surveys and audits, and user/occupant identified requirements.

After identifying the requirements, the BCE determines project scope (required size or capacity), any special technical engineering requirements, the project cost estimates, the most cost effective solutions, and work classification.

Programming is the process of acquiring the authority, resources, and funding necessary to accomplish the planned work. Real property maintenance by contract (RPMC) is divided into various program types, depending on level of authority and fund source. The various programs in which contract projects are programmed are operations and maintenance (O&M), Military Construction Program (MCP), Military Family Housing (MFH), Non-Appropriated Fund (NAF), medical, Defense Logistic Agency (DLA), RED HORSE, Host Nation Funding, NATO, associate units, and environmental. Each program has its own level of funding authority and documentation required to validate projects.

Projects requiring MAJCOM, Air Staff, or congressional approval require a DD Form 1391. This includes a detailed cost estimate, requirement, justification, and impact if not provided. Also included are site plans, before and after floor plans, or new proposed floor plans. For new con-

struction or additions, a space requirements calculation is also required.

The Base Development programmer classifies the work, determines requirements, and prepares the necessary documentation to obtain the authority to execute the project. This requires close contact with all base organizations, associate units, and the MAJCOM. The programmer must have a wide field of experience in civil, mechanical, electrical, and architectural engineering and have the ability to envision the final project without the aid of detailed drawings. Usually, the programmer's only source of information is the description of work given by the customer on an AF Form 332. Site surveys, along with customer consultation, are necessary to refine the scope of work.

When work involves organizational relocation or expansion, required space becomes a controversial issue. Air Force guidance on space requirements is available in Air Force Handbook 32-1084, *Facilities Requirements*. Air Force Reserve units shall use guidance provided in Air Force Reserve Command Handbook 32-1001, *Standard Facility Requirements*.

Programming actions are auditable and subject to statutory limitations. After facility requirements are identified, the programmer develops the project proposals and presents them to facility board for validation, prioritization, and approval by the proper authority.

4.3 Work Classification

One of the keys to properly programming facility requirements is work classification. Work authorization and approval levels and appropriate funding sources vary with work classification. In general, real property maintenance work will be classified as maintenance, repair, or minor construction.

4.3.1 Maintenance

Maintenance is the day-to-day work required to preserve real property facilities and prevent premature failure or wearing out of system components. Maintenance includes work to prevent and arrest component deterioration. It also includes work required to restore components which have deteriorated, but have not completely failed or exceeded their economic life.

4.3.2 *Repair*

Repair is work required for any facility (i.e., building, utility system, or other real property infrastructure) or facility component to restore it to safe, effective, and economical support of assigned missions and organizations. This also includes any improvement to an existing imperviously paved surface.

Repairs include restoration or replacement of components and systems that have worn out, failed, or exceeded their economic life. This is accomplished by installing modern, reliable, maintainable, functional, economical, and energy efficient materials and equipment. Repair is also defined as work required to rectify fire or other occupational safety and health code deficiencies.

Modifications to utility systems (i.e., building, generation, or distribution systems) to reduce O&M costs or provide more reliable services are considered to be repairs. O&M cost reduction or reliability is achieved by increasing the capacity and/or efficiency needed to effectively support current requirements.

For buildings, repair includes the addition, rearrangement, or removal of non load-bearing walls. Repairs are done to restore a building to functional standards. The repair should make an existing building fully functional and capable of supporting assigned missions or organizations effectively and efficiently. Restoration facilitates the consolidation of similar functions or organizations and the inactivation or removal of excess facilities.

If the entire wing or entire building floor of a large building requires revitalization and is estimated in excess of \$5 million, it should be programmed through the MILCON program. Comprehensive revitalization projects costing less than \$5 million may be accomplished through the O&M program. However, only one O&M-funded, comprehensive revitalization project may be accomplished in a building during a five-year period. The intent of this restriction is to preclude the investment of millions of dollars on the comprehensive revitalization of a building through a series of projects accomplished over several years. It would also be minor construction.

4.3.3 *Minor Construction*

Minor construction projects are authorized by 10 U.S.C. 2805. Minor construction projects are military construction

projects for a single undertaking with an approved cost equal to or less than \$1.5 million. Minor construction projects costing \$500,000 or less are authorized to be funded from the O&M appropriation. An exception to this are projects intended solely to correct a deficiency which is life-threatening, health-threatening, or safety-threatening. In these instances, the Deputy Assistant Secretary of the Air Force (SAF/MII) may approve minor construction projects costing equal to or less than \$1 million. Minor construction includes the following types of projects:

- (1) The construction, erection, or installation of a new building or system.
- (2) Work expanding the current size of an existing building by constructing additional functional space; e.g., by constructing a building addition or adding additional levels.
- (3) Converting a building from one primary function to another; i.e., work resulting in a change to the first digit of the six-digit facility category code. When repair work is required in the same building, but unrelated to the conversion project, it may be programmed as a separate repair project and executed with the conversion project. The programming documents for these unrelated, minor construction and repair projects must be cross-referenced.
- (4) Repair-type work which exceeds 70 percent of a building's replacement cost. When the estimated cost to repair a building exceeds 70 percent of the replacement cost, a replacement building should usually be programmed through the MILCON program. However, when other factors dictate retention and restoration of the existing building (e.g., the case of a building on the historic register), such repair-type work is referred to as rehabilitation and is programmed as construction class work (Refer to AFI 32-1021, *Planning and Programming of Facility Construction Projects*, and AFI 32-1032, *Planning and Programming Real Property Maintenance Projects Using Appropriated Funds (APF)*, for more detailed information on minor construction projects)

4.3.4 *Work Done for Others*

The BCE may perform other types of work which are not directly related to real property maintenance, repair, or construction and which does not fit the above described work categories. Common examples include burying communi-

cations cables, work on non-real property equipment (e.g., equipment listed on the Equipment Authorization Inventory Data (EAID) account), or installing raised flooring or air conditioning for computer equipment (See AFI 65-601, Volume 1, *Budget Guidance and Procedures*). This type of work is not subject to the limitations placed on repair or minor construction.

4.3.5 Demolition Work

The demolition or removal of a facility, or portion of a facility, unrelated to any repair or construction project is not considered to be a class of real property maintenance work. Costs for such independent facility demolition and removal work should be charged to cost account code 60000 (see AFR 700-20, Volume 1, *Air Force Data Directory*, for cost account codes). If demolition or removal work is associated with a repair or construction project, the cost for this demolition or removal work is a funded cost of the project.

4.4 Project Approval Levels

Project approval levels are shown in Table 1. O&M Funded Projects and Table 2. MFH Funded Projects.

The MAJCOM project approval authority for O&M funded projects are in accordance with AFI 32-1032, *Planning and Programming Real Property Maintenance Projects Using Appropriate Funds*.

Table 1. O&M Funded Projects

Class of Work	Approval Authority
Maintenance	Unlimited
Repair	\$5,000,000
Minor Construction	\$500,000

MAJCOM project approval authority for P-722 funded military housing projects is in accordance with AFI 32-6002, *Family Housing Planning, Programming, Design and Construction, Table 1.1*.

Table 2. MFH Funded Projects

Class of Work	Approval Authority
Maintenance and Repair	\$1,000,000
• Non-GOQ	\$15,000 per unit per year and less than 50 percent replacement cost, unlimited per project

• GOQ	\$25,000 per unit per year and less than 50 percent replacement cost, unlimited per year
Minor Alterations	<ul style="list-style-type: none"> • \$3,000 per unit, not to exceed \$200,000/per project in any fiscal year • \$5,000 per project for support facilities • \$25,000 per project for streets and utilities
Restoration	Less than 70 percent of replacement cost or \$100,000 per unit, whichever is less

The MAJCOMs usually delegate all or part of this approval authority to the wing commanders. The wing commander further delegates this authority to the Base or Deputy Base Civil Engineer.

Minor construction projects for which funded cost is between \$500,000 to \$1,500,000 are funded from the MILCON unspecified minor construction account (P341). For projects exceeding \$500,000, SAF/MII is the project approval authority for all P341 projects and submits the required notification to Congress.

4.5 Project Documentation

The programmer prepares the appropriate project documentation based on the work classification and total funded cost of the facility project. All projects exceeding the installation commander's approval authority must be documented on a DD Form 1391, FY Military Construction Project Data. Projects within the installation approval authority are documented on AF Form 332, Civil Engineering Work Request; AF Form 327, Civil Engineering Work Order; or DD Form 1391. These project documents must be signed by an appropriate approving official and must include an approval date.

All project documents must include sufficient information to allow an independent reviewer to understand the requirement, benefit, classification of work, total cost (funded and unfunded), impact if the project is not done, and timing of the project requirements. Using organizations must develop the project justification for user-generated projects.

4.6 MILCON Programming

Guidance for the planning and programming of major facility construction projects (MILCON) is provided in AFI 32-1021, *Planning and Programming of Facility Construction Projects*. The MILCON program includes construction projects for all types of buildings, airfield pavements, and utility systems costing \$500,000 or more. It can also include repair projects costing over \$500,000 or more; however, repair projects are usually accomplished from O&M funds.

4.6.1 MILCON Definition

Military construction, as defined in the law, includes any construction, development, conversion, or extension of any kind carried out with respect to a military installation. It includes all construction work necessary to produce a complete and usable facility or a complete and usable improvement to an existing facility.

Authority to carry out a military construction project includes authority for surveys and site preparation; acquisition, conversion, rehabilitation, or installation of facilities; acquisition and installation of equipment and appurtenances integral to the project; acquisition and installation of supporting facilities (including utilities) and appurtenances incident to the project; and planning, supervision, administration, and overhead incident to the project.

4.6.2 Project Justification

The installation programmer must prepare strong, accurate justification data for MILCON projects. Justification preparation is one of the most important actions in MILCON program development and is documented with a DD Form 1391, FY Military Construction Program. Variations from sizing guidance in AFH 32-1084, Facility Requirements, and MILHNDBK 1190 must be justified.

The DD Form 1391 is used to explain and justify installation facility requirements at all levels in the Air Force: the Office of the Secretary of Defense, the Office of Management and Budget, and Congress. MAJCOMs must make sure all justification data is clearly stated because there will be numerous occasions when the DD Form 1391 will stand alone. Without the benefit of being accompanied by oral explanations, it will be used at high levels in reaching decisions that impact the approval of the project. It must clearly describe the impact on mission, people, productivity, life-cycle cost, etc. if the project is not done.

4.6.3 *Cost Estimates*

The Contracts Element must develop accurate cost estimates for building the Air Force budget. At a minimum, these estimates will be based on a completed Requirements Document (RD) (see AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*) and a parametric cost model estimate (defined as equivalent to 15% design complete) or conceptual design. MAJCOMs will ensure such estimates are developed in a timely manner so HQ USAF/ILEC can reflect them in the Budget Estimate Submission (BES) submittal.

4.6.4 *MILCON Process*

The processing of MILCON projects from project identification, prioritization, budgeting, congressional approval and authorization is fully described in AFI 32-1021, *Planning and Programming of Facility Construction Projects*. General guidance is also included for programming of special MILCON programs (i.e., medical, defense access roads, energy conservation, liquid fuels, Productivity Investment Fund, and land acquisition).

4.7 **Unspecified Minor Construction (MC)**

Minor construction projects were previously described in paragraph 4.3.3, Minor Construction. The unspecified MC program, commonly referred to as the P341 program, funds urgently required construction projects from an annual MILCON appropriation for projects whose funded cost is between \$500,000 and \$1,500,000. Deputy Assistant Secretary of the Air Force (SAF/MII) may approve unspecified Military Construction projects intended solely to correct a deficiency that is life-threatening, health-threatening, or safety-threatening and costing equal to or less than \$3,000,000. (Refer to AFI 32-1021, *Planning and Programming of Facility Construction Projects*, and AFI 32-1032, *Planning and Programming Real Property Maintenance Projects Using Appropriated Funds (APF)*, for more detailed information.)

4.7.1 *Justification and Submittal*

The submittal of the justification to MAJCOM for subsequent transmittal to HQ USAF/ILEC must include detailed information to complement the DD Form 1391 data. A clear statement describing the requirement, identification of the existing mission, and the nature of new requirement should be identified. An explanation of how the mission or the requirement is being, or will be, satisfied in the interim is included. A rationale for the submission's urgency and why it was not included in a prior year MILCON program, and why it cannot wait for the next MILCON program

should be provided. Also, include the date when the requirement was first known, the required completion date, and justification for that date, and a schedule of related equipment delivery. Steps taken to expedite the project (to expedite design, to award construction quickly) including the design and construction schedule are part of the submittal.

The justification describes all actions taken to satisfy the requirements and identify other reasonable alternatives considered and an explanation of why they were not adopted. Also included is an identification of any O&M work associated with the total project scope and copies of DD Forms 1391 for the companion project. Companion projects on DD Form 1391 documents are annotated. A certificate of compliance, signed by the host installation commander and endorsed by the MAJCOM commander or designate, is provided.

4.7.2 *Approval Process*

The approval process for MC begins when MAJCOMs submit Minor Construction projects to HQ USAF/ILEC for validation. HQ USAF/ILEC submits validated projects to SAF/MII for approval. SAF/MII approves the project and notifies the House and Senate Armed Services and Appropriations Committees of the intent to accomplish the project. If no committee raises an objection within 30 calendar days after notification, the notification process is complete and HQ USAF advises the MAJCOM.

It is Air Force policy to resolve an objection, if raised, prior to proceeding with the project. For the Air Force Reserves, HQ AFRC/CE will approve Minor Construction projects costing less than \$500,000.

4.7.3 *Execution*

Upon formal approval of a minor construction project, the design and construction responsibilities transfer to the Engineering Flight Contracts Element for project execution. HQ USAF/ILEC enters the approved project scope and cost into the Programming, Design, and Construction (PDC) computer system and authorizes the MAJCOM to initiate the design. The MAJCOM provides the design funds using P313 funds, unless design is done in-house. Design procedures should follow the guidelines prescribed in Chapter 2 of this handbook. The MAJCOM requests from HQ USAF/ILEC authority to advertise the project as soon as possible after design completion. When an acceptable low

bid is received, the MAJCOM requests funds from HQ USAF/ILEC for project award. Construction management follows established BCE procedures as outlined in Chapter 2, paragraph 2.6 of this pamphlet.

4.8 Systems Administration

The base development programmers are responsible for creating and entering all contract projects into one of the two computerized databases. When an approved AF Form 332 comes into the Element, an engineering project number is assigned and the project information is entered into either the PCMS/PM or the PDC computerized database used for managing engineering projects. This initial input of the project data is done by a contract programmer. PCMS/PM enables the tracking of all projects regardless of execution. In actual use, PCMS/PM consists of a project directory and nine specific screens containing detailed information on each project. PCMS/PM is linked to the PDC database. The PDC is used to manage MILCON, the MFH P-711/P-713, and Environmental projects. The benefits as management tools provided by the PCMS/PM and PDC are giving visibility to the enormous engineering effort, making project tracking easy, giving everyone access to the same information, making project coordination easier, allowing submittal to higher headquarters, providing a vehicle for communication with higher headquarters, enabling project approval, supporting project funding, and providing a database to manage design and construction schedules.

The maintenance and continual updating of these systems are essential because MAJCOM funding is based on PCMS/PM data and the Facilities Board-assigned base priorities. These databases must also reflect the impact rating as determined by the Facility Investment Metric (FIM). Updating the information in facility investment indices, which are maintained in a separate database, becomes the responsibility of the various project managers or design engineers. SABER personnel, likewise, are responsible for updating both the design and construction inspection screens for their projects. PCMS/PM "user guides" are available from AFCESA which fully describe the basic requirements for inputting project data into this system.

4.9 Funding

All project funding actions are coordinated through the Base Development programmers. Funding issues requiring coordination with MAJCOM, associate units, or other outside agencies are handled by the programming section.

This involves determining the proper funding source, documentation that may be required, and when funds may become available. Coordination of funding requirements effects the overall project execution process from design through construction completion.

4.10 Miscellaneous Programs

Various downward directed programs, studies, and analysis assigned to the Base Civil Engineer are accomplished by base development programming personnel. This element is the focal point for facility capacity analysis, consolidation studies, BRAC questionnaires, and the annual facility assessment programs of the hundreds of base facilities and common infrastructure assessed annually by commanders across the base. Programmers input ratings, provide cost estimates, and identify projects to correct indicated deficiencies.

4.11 Community Planning

The Base Development Community Planning is the focal point for managing the near-term and long-range base development efforts.

4.11.1 Air Installation Compatible Use Zone (AICUZ)

The AICUZ is an ongoing analysis of the effects of noise, aircraft accident potential, and land use and development upon present and future neighbors of the air base. As the manager of this program, the planner assists the contractor in gathering updated flight track, frequency, and aircraft type information, and any other operational changes in the flying mission. Upon completion of the update by the contractor, the planner arranges a public release of the final report through PA and the installation commander. Commissioners from the county, city, and the local municipalities are invited to attend. The planner attends as technical adviser.

4.11.2 Traffic Management

The base traffic engineer conducts base traffic counts, as required, resolves base parking and traffic sign problems, and responds to formal suggestions.

The engineer coordinates all traffic issues relating to transportation/highway access with the state Department of Transportation (DOT) district office and/or county traffic control office. Problems are often solved using conflicting requirements with no guidelines to follow. Contact with the DOT to negotiate for the installation commander often results in developing alternatives to controversial issues.

4.11.3 *Archeological*

All matters relating to conservation of historical resources are coordinated by the community planner. The Historic Preservation Plan along with the Programmatic Agreement with the State Historic Preservation Office (SHPO) provides the basis for base conservation practices. This plan is developed by the community planner with the use of contractor and with the agreement of the SHPO and the National Advisory Council on Historic Preservation (ACHP).

The community planner determines the requirement and funding sources for pre-construction archeological surveys and coordinates the results with the SHPO. Before demolishing any building on base, a check of the historical building inventory is made and conflicts are resolved with the SHPO. This area requires contact with the National Park Service, ACHP, SHPO, and various Archeological/Historical consultants. A large portion of the work in this area involves settling controversial issues or negotiating a resolution where there is no established guidelines. These issues have a great impact on the base's land utilization and real property disposition. The matters in this area are handled solely by the community planner.

4.11.4 *Waivers*

The community planner prepares airfield waivers, explosive site plans, and explosive waivers for the base. An aircraft parking plan and airfield waivers map are prepared as updated for annual submission to MAJCOM for approval. Through airbase planning methods, construction sitings must comply with established clear zones and building occupants are exposed to only job related risk.

4.11.5 *Installation General Plan*

Base leadership works with the planner to determine long-range plans, construction programs, and land utilization. Other development plans include the base Architectural Compatibility Standards and Interior design standards. Overall, the planner also provides input and oversees the development of the General Plan by contract to ensure completeness of contractual obligation and accuracy of the plan. Base maps required by the plan are maintained by the planner who also provides an annual update. The planner ensures all projects meet the mission objectives and long-range base development goals. This area requires close coordination with the installation commander and preparation for briefing VIPs and MAJCOM to project the proper base image.

4.11.6 Intergovernmental Coordination

The intergovernmental coordinator serves as the base representative on the City Metropolitan Planning Organization's (MPO) Technical Coordinating Committee. This committee, comprised of leaders from the local cities, major institutions, state regulatory agencies, and military installations, reviews issues and advises the MPO on a course of action. As the cultural resources manager, the coordinator represents the base on all matters requiring SHPO and National ACHP approval and coordinates with local groups, as required. As the traffic engineer, coordination with the state Department of Transportation and the Military Traffic Command is conducted on an as needed basis.

JOHN W. HANDY, Lt General, USAF
DCS/Installations and Logistics

Attachment 1 Glossary of References and Supporting Information

References

AFFARS, *Air Force Federal Acquisition Regulation Supplement*
 AFH 32-1084, *Facility Requirements*
 AFI 32-1021, *Planning and Programming of Facility Construction Projects.*
 AFI 32-1022, *Planning and Programming of Non-Appropriated Fund Facility Construction Projects.*
 AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects.*
 AFI 32-1024, *Standard Facility Requirements.*
 AFI 32-1026, *Planning and Design of Airfields.*
 AFI 32-1032, *Planning and Programming Real Property Maintenance Projects Using Appropriated Funds (APF).*
 AFI 32-1052, *Facility Asbestos Management*
 AFI 32-6002, *Family Housing Planning, Programming, Design, and Construction.*
 AFI 32-7062, *Air Force Comprehensive Planning.*
 AFI 32-7063, *Air Installation Compatible Use Zone Program.*
 AFI 32-9001, *Acquisition of Real Property.*
 AFI 32-9002, *Use of Real Property Facilities.*
 AFI 32-9003, *Granting Temporary Use of Real Property Facilities.*
 AFI 32-9004, *Disposal of Real Property.*
 AFI 65-601V1, *Budget Guidance and Procedures*
 AFMAN 32-1076, *Design Standards for Visual Air Navigation Facilities.*
 CTL 88-2, *DD Form 1354 Checklist*
 CTL 88-7, *Constructibility Review Checklist*
 CTL 89-1, *Thirty-Percent Design Submittal*
 CTL 89-2, *MAJCOM Construction Management*
 CTL 89-3, *Warranty and Guarantee Program*
 CTL 90-1, *Management of the MILCON Planning and Execution Process*
 CTL 90-2, *Definitions for Design Milestones*
 DFARS, *DoD Federal Acquisition Regulation Supplement*
The United States Air Force Project Manager's Guide for Design and Construction

Acronyms and Abbreviations

3E5X1	The Engineering AFS.
A&E	Architect and Engineer - most commonly referring to the contract firms
A-76 Action	Process, under OMB Circular A-76, under which core responsibilities are contracted
ABSS	Automated Business Service System
ACASS	Architect-Engineer Contract Administration Support System is a an automated performance evaluation system maintained by the U.S. Army Corps of Engineers, North Pacific Division
ACES	Automated Civil Engineer System (Replacement for WIMS)
AFCEE	Air Force Center for Environmental Excellence, Brooks AFB, TX
AFCESA	Air Force Civil Engineer Support Agency, Tyndall AFB FL
AFFARS	Air Force Federal Acquisition Regulation Supplement

AFH	Air Force Handbook
AFI	Air Force Instructions
AFIT	Air Force Institute of Technology, Wright Patterson AFB, OH
AFMAN	Air Force Manuals
AFMS	Air Force Manpower Standards
AFPAM	Air Force Pamphlet
AFS	Air Force Specialty (formally called AFSC - AFS Code)
AICUZ	Air Installation Compatible Use Zone
BCE	Base Civil Engineer
BCP	Base Comprehensive Plan (replaced by the Installation General Plan)
BES	Budget Estimate Submission
CADD	Computer Aided Design and Drafting. A computer-based program that organizes drafting and design functions to produce high-quality facility drawings.
CAS	condition assessment survey, a DoD program to objectively assess and evaluate DoD facilities for developing funding priorities
CATV	cable television
CBA	cost/benefit analysis
CCASS	Construction Contractor Appraisal Support System is an automated performance evaluation system maintained by the U.S. Army Corps of Engineers, North Pacific Division
CCB	Construction Criteria Base database maintained by the National Institute of Building Sciences (NIB)
CDR	contract deficiency report, a report of substandard contract performance
CE	civil engineer (usually associated with Civil Engineer (CE) units)
CEC	office symbol for the CE Engineering Flight
CEMAS	Civil Engineering Material Acquisition System Database
CEO	office symbol for the CE Operations Flight
CEV	office symbol for the CE Environmental Flight
CFA	Commanders Facility Assessment (Replaced by Facility Investment Metric)
COCESS	Contractor Operated Civil Engineering Supply Store
COE	Corps of Engineers
CONS	Base Contracting/Procurement office
CSU	customer service unit
CTL	Construction Technical Letters
DDC	direct digital control
DFARS	DoD Federal Acquisition Supplement
DMRD	Defense Management Review Decision
DO	Delivery Order
DSWO	Direct Scheduled Work Order
EIAP	Environmental Impact Analysis Process
EMCS	energy management control system
ETL	Engineering Technical Letters
FAR	Federal Acquisition Regulations
FB	Facility Board
FIM	Facility Investment Metric
GIS	graphic information system, a linking of database data with CADD drawings

GOCESS	Government Operated Civil Engineering Supply Store
HVAC	heating, ventilation, and air conditioning
IDIQ	Indefinite Delivery/Indefinite Quantity, a type of contract
IFB	Invitation for Bids
IGE	Independent Government Estimate
MAJCOM	major command
MCP	Military Construction Program
MFH	Military Family Housing
MILCON	see MCP
MRA&C	Maintenance, Repair, Alteration and Construction
NAF	Non Appropriated Funds
NAVFAC	Navy Facilities Engineering Command
NPI	Non-Priced Items
NTP	Notice to Proceed
O&M	operations and maintenance
ODBC	open database connectivity, a structure enabling communications between databases
OI	Operating Instructions
OSD	Office Secretary of Defense
PCB	poly chlorinated biphenyl, a hazardous additive to some oils used as coolants in transformers
PCMS	Projects by Contract Management System within the Work Information Management System (WIMS)
PDC	Programming, Design and Construction database within WIMS
PM	Project Management module within the Automated Civil Engineer System (ACES) or preventative maintenance
POL	petroleum, oil and lubricants, AF term for organizations and systems that manage any fuel or oil-based materials
PWS	performance work statement
QAE	quality assurance evaluators, QAFs monitor service contracts
QASP	Quality Assurance Surveillance Plan
RAMP	Requirements and Management plan
RD	Requirements Document
RDT&E	research, development, test and evaluation
RIPE	real property installed equipment, equipment CE physically installs and maintains as part of a facility (e.g., some generators).
RPMC	Real Property Maintenance by Contract
RTA	Ready to Advertise
RWP	recurring work program, the system for managing recurring work
SABER	Simplified Acquisition of Base Engineering Requirements, IDIQ contract that performs minor construction and repair.
SFM	Specially Functional Manager is the senior ranking enlisted person in the specialty
SHC	self help center
SOW	Statement of Work

SQL	structured query language, a method for communicating between databases
UOL	Upward Obligation Letter
UPB	Unit Price Book
URMT	utility rates management team, an AFCESA team to support base utility engineers
VE	Value Engineering
VECP	Value Engineering Change Proposals
WIMS	Work Information Management System
WRRB	Work Request Review Board (also known as WORB, Work Order Review Board)

Attachment 2 Constructibility Review Checklist Items

ALL PURPOSE CHECKLIST		PAGE 1 OF 4 PAGES	
TITLE/SUBJECT/ACTIVITY/FUNCTION AREA		OPR	DATE
Constructibility Review Checklist Format		CONTRACTS ELEMENT	
NO.	ITEM	YES	NO N/A
(Assign a paragraph to each item. Draw a horizontal line between each major paragraph.)			
SECTION I. GENERAL			
1	If the using agency functions will continue, is the project phased to allow this?		
2	If the using agency functions will be affected, have they been notified of the impact?		
3	If the project involves restricted or secured areas, do the project documents make provisions for this?		
4	Make sure phasing has been noted on the Work Clearance Request, AF Form 103, with the user.		
5	If the project involves major road closures, or utility outages, has the user been considered in the phasing?		
6	Have access and haul routes for the contractor been considered?		
7	If the project involves multiple facilities, what is the maximum number of facilities that can be worked on at one time? Is it clear when the contractor will be allowed additional facilities? Is it possible for one inspector to work that many facilities, and maintain several other projects? Is it clear who makes the choice on the order in which facilities are worked?		
8	If there is a maximum time the user can be without the facility, do the project documents consider breaking the contract performance period into material ordering time, and construction time?		
9	If the project documents indicate the presence of asbestos, is it clear where the asbestos is located? Is it clear how much must be removed? Is the method to be employed removing asbestos clear? Is it indicated whether or not the facility will remain occupied? Have all environmental permits been obtained?		
10	Are the sections and details easy to locate?		
11	Are items specified "as indicated" or "where indicated" in fact indicated on contract drawings?		
12	If there are references in the specifications to industry standards, are they specific enough to be of any use?		
13	Does the AF Form 66 accurately reflect the material submittals called for in the specifications?		

NO.	ITEM	YES	NO	N/A
	(Assign a paragraph to each item. Draw a horizontal line between each major paragraph.)			
14	Does the contract performance time seem reasonable? Are the following considered: a. Long-lead construction or equipment items? b. Local construction customs? c. Local labor availability? d. Does phasing prevent normally concurrent work? e. Local site conditions and restrictions? f. User caused delays?			
15	If there is government furnished equipment involved, is it clear in the project documents exactly what will be provided? At what time, and to what location will the equipment be delivered to the contractor? Is there a memorandum for record filed to document such agreements between Contracts Element and the providing agency?			
16	Is there a basic understanding of what is expected? Is the scope of work clear?			
17	Are there any clear ambiguities of what is expected? Is the scope of work clear?			
18	Does design comply with Command and Base Architectural Standards?			

SECTION II. CONSTRUCTION SITE

- | | | | | |
|---|--|--|--|--|
| 1 | Do the plans accurately depict obvious as-built conditions? | | | |
| 2 | Do the plans accurately depict the locations of utilities, i.e.:
a. Electrical power poles/service to facility
b. Telephone poles
c. Manholes
d. Water lines
e. Gas lines | | | |
| 3 | Will temporary utilities be readily available if the project documents offer them? | | | |
| 4 | Spot check the elevations. Do the plans seem relatively accurate? | | | |
| 5 | Do the plans indicate sodding, or some means for quick turf establishment in problem areas? Do the plans address turf establishment at all? | | | |

SECTION III. ARCHITECTURAL/STRUCTURAL

- | | | | | |
|---|---|--|--|--|
| 1 | Do the plans clearly distinguish the difference in existing a new work? | | | |
| 2 | Does the room finish schedule include information on all rooms indicated to receive work? | | | |
| 3 | Do the specifications call for all color selections to be submitted at one time? | | | |
| 4 | Does the door finish schedule include information on all rooms indicated to receive applicable work? Does it agree with the specifications? | | | |
| 5 | Are all dimensions shown clearly? Do the dimensions shown agree with the indicated scale? | | | |

NO.	ITEM	YES	NO	N/A
	(Assign a paragraph to each item. Draw a horizontal line between each major paragraph.)			
6	Do the structural, mechanical, and electrical floor plans agree with the architectural plans?			
7	Do all concrete columns and walls on architectural plans agree with the structural plans?			
8	Does the reflected ceiling plan agree with the mechanical and electrical plans for the locations of diffusers/registers, and light fixtures?			
9	Do the plans allow adequate space in utility and mechanical rooms for proper installation and maintenance of equipment?			
10	Are all mechanical rooms on the ground floor with exterior doors?			
11	Is there a complete legend for the project including architectural, structural, mechanical, and electrical symbols?			

SECTION IV. MECHANICAL/PLUMBING

1	Do the plans show where all new gas, water, sewer lines etc. connect to existing?			
2	Do the plumbing fixture locations agree with the architectural plans?			
3	Do the plumbing fixtures shown on the plans agree with the fixture schedule, and/or the specifications?			
4	Are all plumbing fixtures connected to domestic water supply, and sanitary drains?			
5	Do the plans for the storm drain system agree with the architectural roof plans?			
6	If there is a fire sprinkler system, are there sprinkler heads in all rooms?			
7	If there is any above ground exterior piping, is any consideration given to freeze protection?			
8	Are all pipe concealment spaces, or chases shown on architectural plans?			
9	Do the plans allow for adequate ceiling height to install new ductwork at worst case intersection?			
10	Do the project documents call for structural support of piping, ductwork, plumbing fixtures and all mechanical equipment?			
11	Is there a size indicated for all ductwork and piping?			
12	Is there a schedule of performance on the plans, or in the specifications for all mechanical equipment?			
13	Are all schedules of performance filled in with units, numbers, or N/A?			

NO.	ITEM	YES	NO	N/A
	(Assign a paragraph to each item. Draw a horizontal line between each major paragraph.)			
14	Is all roof mounted, or externally mounted, mechanical equipment shown on architectural plans?			

15	Does all mechanical equipment show connections for piping, power, controls etc., as necessary?			
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SECTION V. ELECTRICAL

1	Do all light fixtures agree with the reflected ceiling plan?			
2	Do the electrical plans indicate that all major pieces of equipment receive power? Does all the scheduled mechanical equipment in the mechanical plans receive power? Do the voltages, phases, and frequencies in the mechanical schedules agree with the electrical plans?			
3	Is the location for all panel boards shown in the plans and on the electrical riser?			
4	Do the specifications require that all electrical work be in accordance with the latest edition of the NEC?			
5	If the plans call for removing existing panels and installing new, is temporary power provided for in the project documents? If not, is this acceptable?			
6	Does all electrical equipment shown scheduled or sized on plans agree with schedules or sizes in specifications?			

SECTION VI. ENVIRONMENTAL

1	Are there any environmental contaminants that may be present in existing equipment or on site? (i.e. - asbestos, lead paint, Hazardous Air Pollutants (HAPs), contaminated soil, Ozone Depleting Chemicals (ODC's), etc).			
2	Are there any environmental materials that can be recycled or recovered? (i.e. - Ozone Depleting Substances (ODS's), Halon, lubes, etc)			
3	Has the project been reviewed by a base environmental representative?			